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CLARK CARLOADER

—a new power tool for handling materials and parts, in transit, in storage and in production. It multiplies man power—speeds handling—lightens loads—tiers to the roof—cuts costs radically in a new economic era that requires new thinking, new methods, new mechanical aids. With the Clark Carloader, one man can load or unload a box car in two hours.

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CLARK TRUCTRACTOR

Div. of Clark Equipment Co.

111 SPRINGFIELD PLACE • BATTLE CREEK, MICH.

AUTOMOTIVE INDUSTRIES
The Automobile

Reg. U. S. Pat. Off.
Published Weekly

Volume 80 Number 4

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HERBERT HOSKING, Editor
P. M. HELDT, Engineering Editor — J. B. POLLOCK, Ass't Editor
JOS. GESCHELIN, Detroit Technical Editor — MARCUS AINSWORTH, Statistician
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H. E. BLANK, JR., Ass't Editor — JAMES G. ELLIS, Washington Editor
B. M. IKERT, Contributing Editor

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AUTOMOTIVE INDUSTRIES

Vol. 80, No. 4
January 28, 1939

New Willys Head Sees Good Times Ahead for Small, Low-Priced Car

J. W. Frazer Takes Up Duties As President of Toledo Company

Joseph W. Frazer, newly-elected president of Willys-Overland Motors, Inc., has assumed his duties at the plant and will move his family to Toledo immediately.

"I believe Toledo and the Willys-Overland have a great future," he said. "Nothing but a sincere conviction that the small, low-priced car offers the greatest opportunity to build a huge success could have induced me to leave Detroit after 15 years of most pleasant and cordial association with one of the most successful automobile manufacturers in the industry.

"I believe that the type of car that Willys-Overland manufactures represents the brightest spot in American business."

Mr. Frazer succeeds David R. Wilson, who headed the company during its rehabilitation, and who is now at Long Beach, Calif., for a rest period.

Other officers of the company were re-elected, including Ward M. Canaday, chairman of the board, and A. L. Floering was added as an assistant secretary.

Mr. Frazer, now 46 years of age, has been in the automobile business for 27 years. He served for a time with Pierce-Arrow and General Motors and joined Walter P. Chrysler in 1924 when he took over the Maxwell as the foundation for the present Chrysler Corp. Mr. Frazer served in various executive capacities until he rose to be vice-president of the Chrysler Sales Corp.

Coincident with the making of Joseph W. Frazer president of Willys-Overland Motors, Inc., came announcement of the incorporation of the American Helicopter Corp. by interests close to the automobile company.

Incorporators are George W. Ritter, secretary and general counsel of Willys-Overland; Milton M. McCreery, a director of the automobile company, and A. L. Floering, assistant secretary.

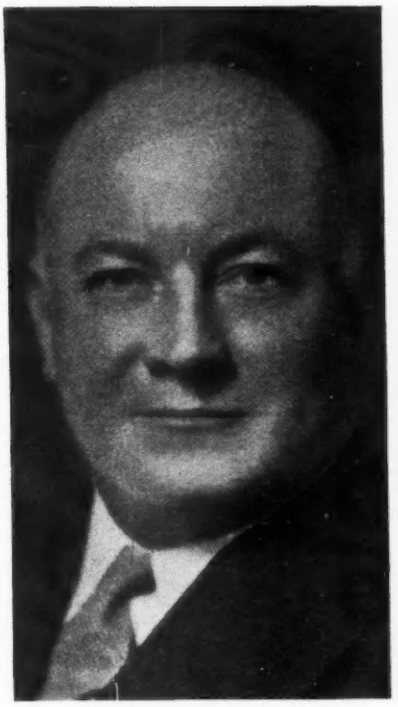
President of the new company will be Howell French, formerly a sales promotion manager of Willys-Overland and in recent years associated with aircraft manufacturers. Mr. Floering will be secretary.

Mr. Ritter indicated that the new development is in the initial stages. It was indicated, however, that Willys-Overland has the engineering staff, engine manufacturing facilities, and a surplus of plant space available for airplane construction.

The plane being developed by the new organization is understood to represent several improvements on modern gyro planes.

CHARLES L. JACOBSON

. . . has been named vice-president and general sales manager of the Chrysler Sales Corp., succeeding Joseph W. Frazer who recently resigned to accept the presidency of Willys-Overland. Mr. Jacobson is a veteran of 25 years in the automobile industry, over 14 years of which have been with Chrysler.



JOSEPH W. FRAZER

. . . newly-elected president of Willys-Overland Motors, Inc., succeeding David R. Wilson. (See "New Willys Head" on this page.)

Forecast February Output of 350,000

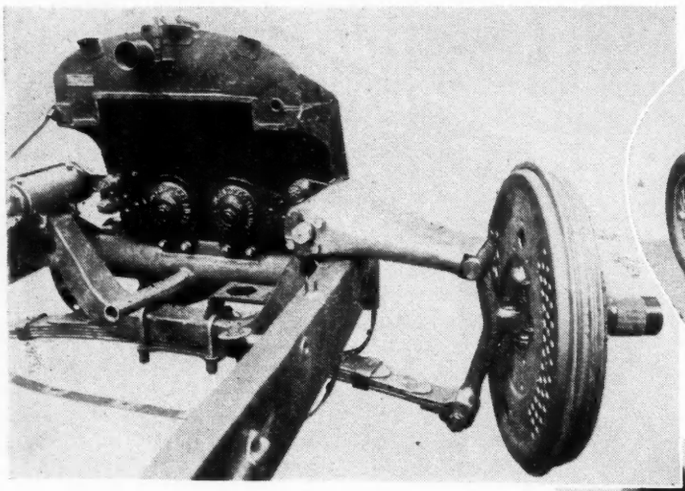
1939 Output May Total 3,500,000

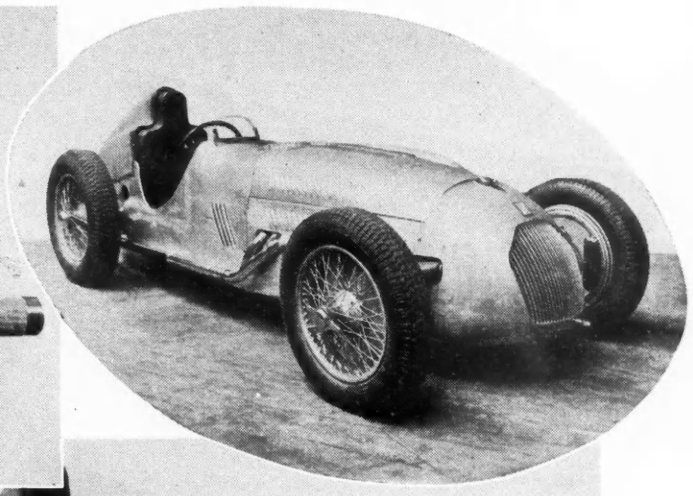
Car and truck production appears to have established its pace for the winter season with current weekly output continuing to run along at levels well above those in effect a year ago and with every indication that these levels will be maintained well into February, followed at that time by increases in anticipation of the spring selling season.

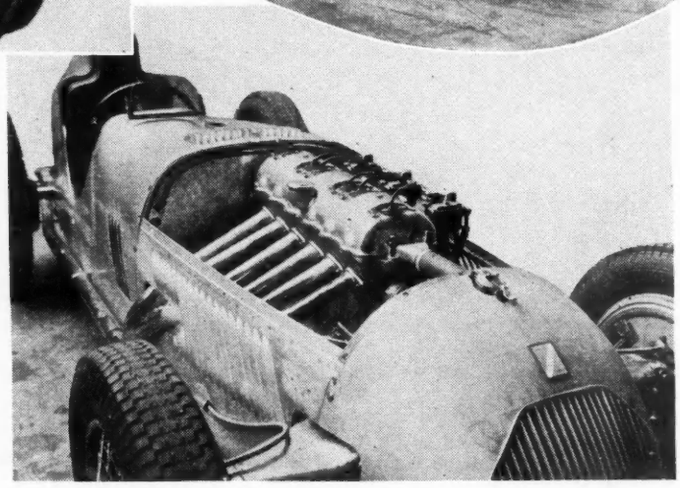
Except for minor fluctuations in the case of individual producers, the industry finished its third consecutive week with an output ranging between 85,000 and 90,000 units weekly. Combined with the holiday-shortened first week of the month, January production to date has reached an estimated total of

(*Turn to page* 96, *please*)

France Will Seek More Racing Laurels With Team Of New Government Subsidized Talbot Darracq Cars







Three views of the Talbot Darracq government subsidized racing car. Above is a close-up of the front independent suspension. The car shown in the oval and at the right is powered with a six-cylinder non-supercharged engine and is intended for use on hilly, winding tracks. Another model has a supercharged 16-cylinder engine, will be used for fast road courses.

This year, for the first time, France will line up against Germany and Italy in international racing with a subsidized team of cars. The $14,000 received by Talbot Darracq from the national racing fund has enabled the French firm to complete a set of five cars.

One type of chassis and two types of engines have been produced, one being a 6-cylinder non-supercharged powerplant of 4½ liters displacement (274.5 cu. in.) and the other a 16-cylinder supercharged model of 3 liters displacement (183 cu. in.). The cars have to run under the common minimum weight of 1873 lb.

A conventional box section chassis is used, with a transverse spring in front mounted inside a channel section cross-frame member. Connection from the steering head to the chassis is by an oval-section wishbone, mounted at its inner end on the hydraulic shock absorber shaft. Each hydraulic shock absorber is supplemented by a friction-type shock absorber carried crosswise on a big-diameter tubular frame member just behind the radiator. The wishbone is designed to take all the brake reaction. The engine is mounted at the rear to a banjo cross-frame member and at the front rests on two brackets with rubber blocks. A Wilson preselective transmission is used and final drive is by open shaft inside a chassis tunnel. Only the front wheels are sprung independently, the rear having a pair of semi-elliptic springs. The tank is an aviation product weighing 26 lb. and has a capacity of 52 gal. Brakes are Bendix mechanical, with aluminum alloy drums having liners. The backing plate has an air scoop in front and an air release at the rear.

The non-supercharged engine has its six cylinders in an aluminum alloy casting, with nitralloy pressed in liners, an aluminum alloy head with bronze valve seats, two inclined valves operated by pushrods, and plain bearings throughout. Three downdraft carburetors are used. Ignition is by a Bosch magneto and as the chassis does not scale up to the minimum of 1873 lb., an electric starter and battery are fitted. Lubrication is by dry sump, with an aviation type oil radiator mounted behind the fireproof dash and having its fins just emerging through the cowl. This engine weighs 352 lb. for an output in excess of 250 hp.

The supercharged engine is of a different type. The 16 cylinders are in two blocks of 8 and the two castings made of aluminum alloy, with bronze heads cast in with the alloy. The cylinder barrels are nitralloy forgings, each one being bolted to its bronze head by means of four bolts. Roller bearings are used for both the crankshaft and the connecting rods. There is a separate displacement type blower for each bank of cylinders, each blower sucking on its own carburetor.

A feature of this engine is the use of a single overhead camshaft for each bank of cylinders, the exhaust valves being operated direct from the cams and the inlet valves through a short rocker. Ignition is by magneto. A starter is carried, but no batteries, current being obtained from the pits. Lubrication is dry sump type, as on the non-supercharged engine. The 3-liter engine, which is now on its bench tests, develops its maximum power at 7000 r.p.m.

Hupp Announces Prices On New Skylark Models

Hupp Motor Car Corp. has announced Detroit delivered prices on its Skylark models as follows: the Flagship, $895; the Mainliner, $975; the Cruiser, $1,075; and the Corsair, $1,145. These prices include Federal tax.

The Corsair may be had in either a convertible phaeton or cabriolet, the others being four-door, five-passenger

touring sedans with differing accessory groups. Custom cars with special upholstery, paint, trim and equipment will be offered at prices ranging up to $2,000.

Present plans call for the start of production on Skylark models during February, according to Norman deVaux, general manager.

Pontiac Deliveries Well Ahead of January 1937

Retail deliveries of Pontiac cars for the first 10 days of January were 84 per cent ahead of the same period of January, 1938. Last January only 1831 new cars were delivered, while during the first 10 days this month deliveries were 3374.

Used cars sales are reported to be holding up well. During the first 10 days of January this year Pontiac dealers delivered 6889 used cars compared to 6212 for the first 10 days of December and 6927 for the corresponding period of 1938. Used car inventories likewise are more satisfactory than last year, there being 29,493 used cars in the hands of dealers compared to 40,122 last year.

New Canadian Company To Build Snowmobiles

Snowmobiles will be manufactured by the recently organized S & S Aircraft Co., Canada. The vehicles will be powered with gasoline engines and propeller driven. Skis are of the laminated aircraft type made with three layers of oak. In tests made at the Winnipeg airport the snowmobile reportedly attained a speed of 40 m.p.h., and high snow drifts and bare patches of sticky earth were said to have been no obstacles to its satisfactory performance.

Buick Beats Its 1938 Record for Deliveries

Domestic retail deliveries of Buick motor cars during the first 10 days of January totaled 3626 units, compared with 5988 in the corresponding period of December and with 2587 in the first 10 days of January last year.

This was an increase of 40 per cent over a year ago and a decline, representing seasonal trend, of 39 per cent under the first December period. The decline at this time a year ago was 44 per cent from the corresponding December deliveries.

The company is carrying approximately 7000 unfilled retail orders on its books with output keyed to retail requirements in the field. Used car sales were substantially over this period a year ago, with 7933 deliveries against 6053 in the first 10 days of January last year, while used car stocks were substantially below 1938 levels.

"Flexibility of Hours" Essential for Higher Earnings, Warns Graham

Goodrich Vice-President Tells Akron Workers That Six-Hour Day Thinned Their Weekly Wage

With new contract negotiations between management of the B. F. Goodrich Co. and officials of the Goodrich local, United Rubber Workers Union of the CIO, deadlocked over several issues, vice-president T. G. Graham of the company has issued a special bulletin to all employes in which he maintains that hourly rates being paid at the Akron Goodrich plants are "among the highest rates paid to industrial workers in the entire world," with November hourly earnings of men averaging one-fifth higher than the average in the rubber industry and one-half higher than the average in all industry in the United States.

"Only as the flexibility of our working hours increases can we hope for increased weekly, monthly and annual earnings," declared Graham, asserting that the high hourly rates did not benefit employes because "your weekly earnings have gone down and the company has been penalized by the high costs resulting from high hourly earnings which are so much above the hourly earnings of competitor plants. High hourly rates mean high costs, and high costs reduce the opportunity for sales. This disadvantage leads to less work and fewer hours with ever-decreasing weekly earnings."

Graham pointed out that despite the high hourly earnings, which in 1938 were the highest in the company's history, weekly earning averages had declined sharply. He cited figures showing that the average hourly earnings of men were $1.12 in 1938 compared with $1.10 in 1937 and $1.00 in 1936.

But average weekly earnings were only $27.45 last year as compared with $31.45 in 1937 and $33.40 in 1936, he said. The factor which caused the decrease in pay was that average hours worked weekly dropped from 33.4 in 1936 to 28.6 in 1937 and then to 24.5 in 1938.

Graham recalled that in October, 1936, the company told employes that "If the working day for all Goodrich employes is limited to six hours, the average hours worked in 1937 will be less than 30 hours per week . . ." and that "flexibility in hours is essential if maximum annual earnings are to be enjoyed."

Analyzing his statistics, he wrote:

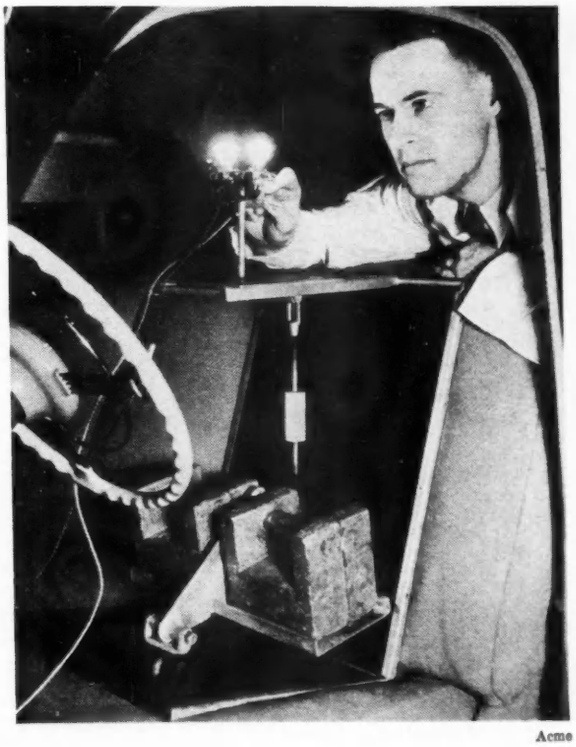
"Last year, if flexibility in hours had been permitted it would have been possible for 4,365 persons, or about half of our Akron employes, to benefit through increased hours which were available to them.

"But the limitations of the six-hour day are positive and prevented half of our Akron employes from enjoying increased earnings."

In conclusion he warned that "weekly earnings must continue to decrease if weekly hours continue to decrease."

Dummy Driver

"Charlie," a dummy driver with two electric bulbs for eyes, is used to determine the angle of visibility of windshields at Chrysler Corp.'s engineering laboratories. Shown in the front seat of a 1939 car, "Charlie" throws light through the windshield and side windows, outlining them on a white screen placed at a certain distance in front of the car. The screen, which is marked off in degrees, indicates how much the average driver can see through the windshield.



Acme

Dual Unionism Bogey Threatens As UAW Warring Factions Split

CIO Recognition of Group Opposing President Martin May Mean Trouble

Manufacturers in the automotive industry were confronted with serious new problems in their labor relationships as dual unionism appeared to have become a certainty following a definite split between warring factions in the United Automobile Workers union.

All hopes for a last-minute peace between Homer Martin, embattled president, and a 15-man opposition group on the international executive board, disappeared on Jan. 24 when CIO officials in Washington formally recognized the latter group as the official UAW board, naming R. J. Thomas president and branding Martin as a flagrant violator of the UAW constitution for his action in suspending the board members who had opposed him.

Meanwhile manufacturers who had in good faith entered into agreements with the UAW appeared to be headed for the delicate problem of deciding which group they could depend upon for responsibility in living up to the agreements. Announcement by the CIO-blessed faction that it would begin immediately to resume negotiations started by Martin, and suspended because of the internal fight, for amendments to several existing contracts indicated that the situation would soon be brought to a head.

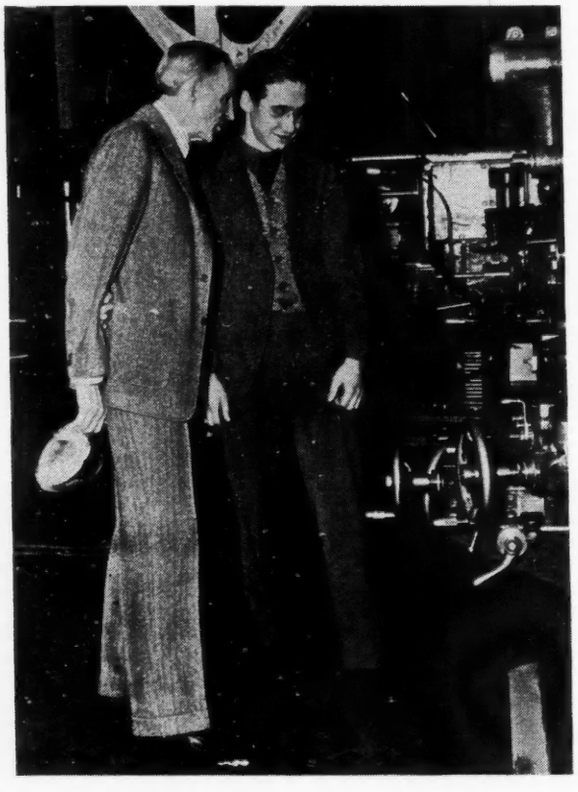
Martin has declared the CIO action to be a declaration of war and was reported to have begun negotiations immediately for the support of David Dubinsky, president of the International Ladies Garment Workers Union, which recently seceded from the CIO. Pending a definite test of strength between the Martin and CIO factions it is expected that the status of present agreements with the UAW will remain in doubt with the further possibility that serious disputes, with no recognized arbitration machinery available, will occur before the atmosphere is clarified.

Reo Co-Trustee Decision Is Deferred Until Feb. 6

Decision on the appointment of a co-trustee for the Reo Motor Car Co. has been deferred until Feb. 6 by Judge Arthur F. Lederle of the Detroit U. S. District Court, at which time stockholders also will have an opportunity to be heard on the company's petition for reorganization under Section 77-B of the National Bankruptcy Act.

Removal of A. J. Brandt, temporary trustee, was asked by the Securities Exchange Commission on the grounds that he was not qualified because he was not a disinterested party. The court had indicated that it might appoint a co-trustee to serve until the hearing. Results of the hearing are expected to indicate future steps in the clarification of the company's financial status.

Frank Alborn, formerly chief engineer for White Motor Co., Cleveland, has been acting recently as chief engineer at Reo. Company officials indicated that Alborn was pinch-hitting for H. D. Church, former White vice-president, who is expected to become the Reo chief engineer.



No. 2500

Henry Ford extended a personal welcome to Ralph O. Lill recently when the 19-year old Detroit boy became the twenty-five hundredth student to enroll in the Ford Training School. The school was established three years ago at the company's Rouge plant to provide recent high school graduates with the opportunity to train for skilled jobs in industry.

N.Y.U. to Assist In Safety Effort

The extension program of adult education in the New York University Division of General Education will assist in the national campaign for traffic safety by inaugurating Feb. 13 four courses designed to meet the problems of accident prevention through instruction in the safe operation of motor cars.

Courses will consist of classroom instruction in the essentials of the automobile and a series of road lessons in a 1939 dual-control driver training car under the direction of four member's of the Center's staff, headed by Dr. Herbert J. Stock.

Kenworth Motor Truck Gets $59,041 Contract

The Bureau of Reclamation, Department of Interior, has awarded a $59,041 contract to the Kenworth Motor Truck Corp. of Seattle, Wash., for eight tank trucks equipped to transport fish in 1000-gal. tanks, each with a circulatory and temperature-controlled system.

IHC Will Pay $1.75 Dividend on March 1

The regular quarterly dividend of $1.75 on the preferred shares of the International Harvester company was voted recently by the directors. The disbursement will be made March 1, to stockholders of record Feb. 4.

Spicer Signs a New Agreement with UAW

A new agreement has been signed by Spicer Mfg. Corp. and Local 12 of United Automobile Workers in Toledo embodying a clause providing for continued and frequent conferences relative to holding employment for the 1500 workmen in the plant level during the year.

This was the compromise on the effort of the union to get a guaranteed annual wage for its members.

There was no general wage increase provided in the new contract although some adjustments in classifications will

provide advances for certain employes. The contract runs for a year.

Thomas Burke was in charge of the negotiations for the union and E. C. Mogford, vice-president, represented the Spicer management.

Publications

A **turbine,** in the 100 to 2000 hp. range, manufactured for every type of industry using mechanical and electrical power, is described in a new booklet released by the Westinghouse Electric & Mfg. Co.*

Landis chaser grinders and chaser grinding fixtures are described in a new bulletin issued by the Landis Machine Co., Inc., Waynesboro, Pa.*

"Dirt-Moving with International Trac-TracTors" is the title of a brochure recently prepared by the International Harvester Co., Inc., Chicago.*

The Atlas Press Co., Kalamazoo, Mich., general catalog for 1939, just released, presents complete information on Atlas **lathes, shapers, drill presses, arbor presses** and **shop equipment.***

The Ball and Roller Bearing Co., Danbury, Conn., has issued catalog No. 15 describing its complete line.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Monthly Motor Vehicle Production

(U. S. and Canada)

	Passenger Cars		Trucks		Total Motor Vehicles	
	1938	1937	1938*	1937	1938*	1937
January	168,890	324,191	58,262	74,995	227,152	399,186
February	151,133	310,961	51,464	72,939	202,597	383,900
March	186,341	423,006	52,256	96,016	238,597	519,022
April	190,111	452,907	48,018	100,324	238,129	553,231
May	168,599	443,412	41,575	96,965	210,174	540,377
June	147,545	429,333	41,857	91,820	189,402	521,153
July	112,114	372,913	38,336	83,996	150,450	456,909
August	61,687	317,270	35,259	87,802	96,946	405,072
September	69,449	120,597	20,174	55,033	89,623	175,630
October	192,906	306,040	22,380	31,939	215,286	337,979
November	335,767	309,121	54,638	67,508	390,405	376,629
December	341,524	259,184	65,492	88,165	407,016	347,349
Total	2,126,066	4,068,935	529,711	947,502	2,655,777	5,016,437

* Revised for all months.

Shift Date for FTC Hearings On GM "FOB Price Case" to Feb. 21

Ourselves and Government—A Check List Of Federal Action Corrected to Jan. 26

LEGISLATION PENDING

RANDOLPH BILL. (H.R. 2767) Provides that a Transcontinental Stream Lined Super Highway Corp. could issue bonds to the extent of $12,000,000,000 and construct a system of highways planned under the direction of the War Department. The corporation would be authorized to collect tolls fixed by the Interstate Commerce Commission. Representative Randolph of West Virginia.

STEAGALL BILL. (H.R. 1033) Designed to provide for the construction of transcontinental highway system, the measure would establish a corporation under the RFC which would subscribe stock to the new agency. It would be empowered to issue debentures for a maximum of $2,000,000,000 a year. Construction and maintenance would be subject to the approval of the War Department.

FEDERAL TRADE COMMISSION

F.O.B. PRICE CASE. Hearings on the Ford case which had tentatively been fixed for Jan. 25 in Washington have been cancelled. No future date has been fixed, but the FTC expects to close its case after the completion of the hearings. Date for GM hearings in Detroit has been changed from Feb. 14 to Feb. 21. Proceeding involves the FTC allegation that price advertising is misleading.

VS. GENERAL MOTORS (no change from last week).

SIX PER CENT CASE. FTC expected to fix a date for final argument in the Ford case soon. FTC and Ford briefs are on file. In the GM case, the company's brief has been received and the FTC brief is due in. The Commission charges that the companies engaged in false and misleading representations in advertising financing plans.

FAIR TRADE PRACTICE RULES (no further developments).

Tune-Up Time

Grand opera, radio, and industrial headliners posed for AUTOMOTIVE INDUSTRIES a week ago last Thursday at the reception in Hotel Astor, New York, following Ethyl Gasoline Corp.'s first coast-to-coast broadcast over the Columbia network. Andre Kostelanetz, the brilliant conductor, left; Paul E. McElroy, advertising manager of Ethyl; Lily Pons, the conductor's bride and famed wherever opera and concert fans gather; Walter O'Keefe, radio master of ceremonies and newspaper columnist; Kay Thompson, radio singer; and J. Coard Taylor, vice-president of Ethyl and, Harry W. Kaley, Ethyl's sales manager. A capacity "first nighter" crowd attended the premier in the CBS radio theatre. The "Tune-Up Time" programs will continue every Thursday from 10 to 10:45 P. M. over 63 stations.

Price Cut Rumors Rampant as Big Steel Orders from Industry Loom

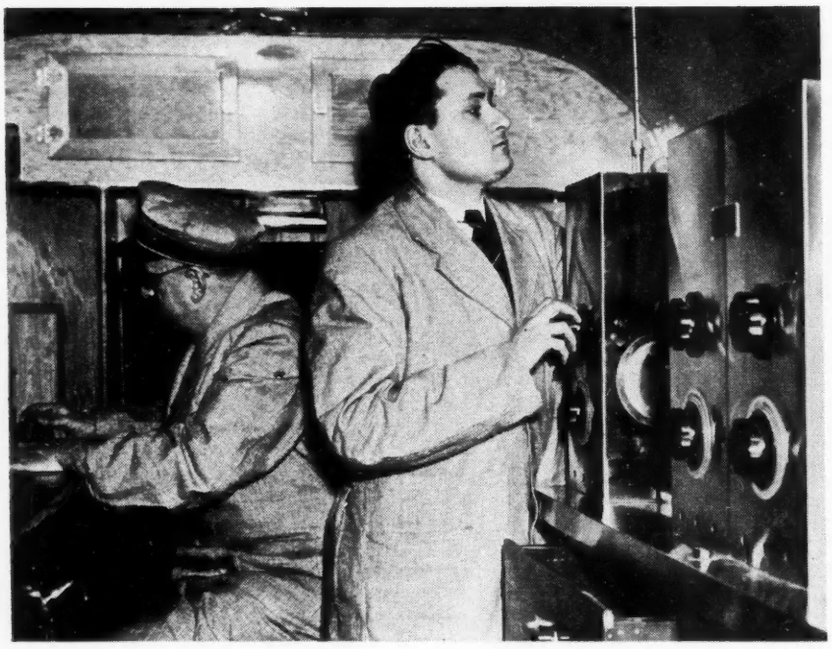
Study of Automotive Metal Market Points to Some Resistance to Higher Prevailing Rates

Considerable jockeying for position developed in the steel market this week, the interpretation that steel sellers put upon a flock of unverifiable rumors of price cuts being that tonnage orders from automobile manufacturers were just around the corner. Wall Street had it that some steel producers had eliminated certain extras and made other concessions without, however, lowering base prices. On the other hand some Detroit reports picture automotive consumers uneasy over getting steel on time, once demand from the construction industries and railroads broadens. With little more than one-half of the country's primary steel capacity employed, dearth of raw steel is hardly to be apprehended in the near future, and the rolling and finishing of flat steels, which form so large a part of automotive steel consumption, is done in mills altogether different from those producing the heavy products used by the railroads and in the construction industry. Deliveries of sheets and strip steel, bought at lower prices last October, have been completed, and a certain amount of resistance to paying the higher prices now asked was to be foreseen. This week's mild dip in employed ingot capacity from 52.7 to 51.2 per cent is thought to be largely due to mills wanting to hold their raw steel reserve down until fresh buying by automobile manufacturers develops. Smaller steel manufacturers in the eastern area, for which the Labor Contracts Board has set a wage minimum of 62½ cents under the Walsh-Healey Act, plan to carry their plea for two months' delay in effecting the wage rise to the U. S. Circuit Court of Appeals, if Secretary Perkins rules against them.

Although copper is one of the essential war metals, Monday's Wall Street war scare caused the price of the red metal in the outside market to give way to the extent of $7 a ton. Secondary refiners lopped $2.50 a ton off the price at which they took in scrap copper. The market turned a shade firmer on Tuesday, when the export price stood at 10.15 cents over $20 a ton below the 11¼ cent price quoted for spot electrolytic by producers and custom smelters. Efforts to curtail mine output and bring it into line with current demand continue.

The tin market recovered partially on Tuesday from the unsettled state of affairs into which European political developments had thrown it. Spot Straits tin was quoted at the opening of the week at 46.15 cents. On Tuesday 46¼ cents was paid for what small tonnages changed hands.

The price of lead was cut early this week by the two leading marketers. It had been 4.85 cents, New York and, following the $2 per ton reduction, quite a little business from storage battery makers was booked at 4¾ cents. —W. C. H.



Acme

Gas Cheaters, Beware!

Field representatives John McGovern (left) and William Hayes (right) check the specific gravity of gasoline taken from filling station pumps and test for kerosene content in the mobile testing laboratory which the Illinois State Finance Department has sent into the field to protect motorists against purchases of "sub-standard" petroleum products sold as cut-rate, high-test fuel.

Houdaille Purchases Accessory Company

Houdaille-Hershey Corp. has purchased the Lowell Heinz Electric Co., Lowell, Mass., manufacturers of automobile accessories. The corporation will continue to operate the Lowell factory.

Booko

THE TORSION TEST, *by Albert Sauveur. Published by the American Society for Testing Materials, 260 So. Broad Street, Philadelphia.*

The torsion test was the subject of the 1938 A.S.T.M. Edgar Marburg lecture delivered by Dr. Albert Sauveur. Following general discussion of the test, there are described the torsion machine, test specimens, and results of tests on various materials. This is followed by information and data on tests at elevated temperatures, twisting in the blue-heat range, reverse twisting, and torsion of single crystals. Copies of the lecture in pamphlet form are 35 cents each.

LE CARBURANT FORESTIER, ETUDE ECONOMIQUE ET GÉNÉRALE EN FRANCE ET DANS LE MONDE, *by Bernard Mazodier, Doctor of Laws. Published by Dunod, 92 rue Bonaparte, Paris.*

It is rather difficult to give a precise translation of the title of this book. "Carburant" is the French word for motor fuel, and the word "Forestier" signifies that it is a product of the forests. If the book were to be translated into English the best title probably would be "Wood as Motor Fuel."

The subject is dealt with more from the economic and the general than from the technical standpoint, and more from the point of view of forestry than of automotive interests. In a lengthy introduction dealing with politico-economic, social and legal problems the author says he should like the reader to regard the terms "political economy" and "trade organization" as the filigree of his book. The first of these explains why there is a question of wood as motor fuel, and the second may point the way toward its solution. If there is a problem which is of prime importance to the existence and the independence of the

nation, it is that of its supply of motor fuel. But it is also because the idea is gaining ground that the forests are a national patrimony which should be exploited to the maximum that France and many other nations are occupying themselves more and more with the problem of the use of wood as motor fuel. It is the author's opinion that the only reason wood is not being used for this purpose in France as much as it should be, is that the wood industry is not sufficiently well organized.

The author deals successively with the problem of a (French) national motor fuel, the mode of use of wood as motor fuel, its economic possibilities and its present status in France and in numerous foreign countries.

SYMPOSIUM ON IMPACT TESTING, *published by the American Society for Testing Materials, 260 So. Broad Street, Philadelphia.*

The symposium on impact testing, held at the 1938 ASTM annual meeting, concentrated on two of the most important phases of the subject, viz., the present commercial uses of the impact test, with particular reference to cases where it gives necessary information not supplied by static tests; and, second, the basic theory of the test. The nine papers of the symposium form a book of 170 pages.

Utility and non-standard impact testing, problems in the field of plastics, practical application of the notched-bar impact test, and use of the Charpy test as a method of evaluating toughness adjacent to welds are covered in separate papers. These are followed by data on stress-strain relations under tension impact loading and a discussion of the theory of impact testing, involving the influence of temperature, velocity of deformation, and form and size of specimen on work of deformation. A review of the literature of impact testing of welded joints is included, as is a résumé of notched-bar testing and impact testing. Copies are $1.26 each.

Oldsmobile January Sales Eclipse Those a Year Ago

Retail sales of Oldsmobiles for the first 10 days of January totaled 3183 units. This is an increase of 84.4 per cent over the 1726 cars sold during the first 10 days of January a year ago.

Automotive Electric Group Holding Annual Conference

The Automotive Electric Association's third annual international distributors' conference opened in Detroit on Jan. 28 and will continue until Feb. 3 at the Book-Cadillac hotel. In conjunction with the conference the association also will hold its 43rd semi-annual convention.

Business Barometers Indicate A Recovery from Year-End Dip Down

An Exclusive and Regular Weekly Feature Written by the Guarantee Trust Co., N. Y.

Moderate recovery from the year-end dip in industrial activity was indicated last week. The *Journal of Commerce* index of business for the week ended Jan. 14 stood at 84.7, as compared with 81.2 for the week before and 70.3 a year ago.

Mixed trends in mercantile lines were again reported last week by Dun & Bradstreet—retail sales tending to lag, while wholesale business was at levels moderately above those of a year ago. In the second week of the month department store sales, as reported to the Federal Reserve Board, were 3 per cent below those of the corresponding week last year, although for the four weeks ended Jan. 14 sales were 2 per cent greater than a year ago.

Output of electricity by the light and power industry in the week ended Jan. 14 was 4.6 per cent above that of the preceding week and 7.3 per cent above the corresponding 1938 production.

Railway freight loadings in the same period increased to 586,877 cars from 530,849 cars in the preceding week and exceeded slightly the comparable 1938 loadings.

Average daily production of crude oil in the second week of the year was 3,243,600 barrels, or 28,700 barrels more than in the preceding week. Current daily requirements, as computed by the U. S. Department of the Interior, amount to 3,270,600 barrels.

Lumber production, shipments, and new orders increased in the same period. Compared with data for the second week of last year, the recent report shows gains of 43.6 per cent in production, 25.2 per cent in shipments, and 34.0 per cent in orders.

Engineering construction awards in the week ended Jan. 19 amounted to $55,489,000, as against $47,669,000 in the comparable period last year, according to the publication *Engineering News-Record.*

Average daily production of bituminous coal in the week ended Jan. 14 was 1,313,000 tons, as against 1,486,000 tons in the preceding week and 1,233,000 tons in the corresponding period last year.

Professor Fisher's index of wholesale prices for the week ended Jan. 21 rose one fractional point to 79.8.

Reserves of member banks of the Federal Reserve System increased $174,242,000 in the week ended Jan. 18. Estimated excess reserves increased $120,000,000 to a new peak of $3,560,000,000.

Post-Graduates

Chevrolet's dealers' sons enrolled in the company's "Post-Graduate School of Modern Merchandising and Management" in Detroit learn their lessons from recognized experts. Here they are shown visiting the General Motors Research Laboratories, where C. F. Kettering, director of research, General Motors Corp., explains some of the engineering research behind the manufacture of the motor car of today.

GM Led Automotive Group In 1938 Magazine Advertising

A Weekly Review of the News in Automotive Advertising Circles

General Motors Corp., with 24 units, leads in the list compiled by *Advertising Age* in magazine advertising during 1938. Of the 262 advertisers who spent $100,000 or more, 32 were automobile, parts, equipment, and fuel companies, the magazine's listing shows. Chrysler, with four motor car units and Airtemp, was second, and Ford, including Lincoln, was third. Texas led fuel and lubricant advertisers and took the fourth place among the automotive group. Included among the motor vehicle manufacturers who spent $100,000 or more, were Studebaker, Packard, Nash, and Hudson, according to the *Advertising Age* report, based on Publishers' Information Bureau data. General Motors dropped from ninth to eighty-fourth place in radio expenditures, however, the 1938 figures as compared with those of 1937 showed.

Paramount moving picture stars will be featured in a new series of advertising by Pan American Petroleum Corp., New Orleans. The copy and illustrations tie in with important Paramount stars and vehicles. Fitzgerald Agency handles the account.

Super Mold Corp., Lodi, Calif., has appointed the Connor Company, San Francisco, to handle its advertising of tire rebuilding equipment.

American Management Association has announced the distribution of entry blanks for the eighth annual Irwin D. Wolf Awards competition for packaging. The packaging exposition will be held March 7 to 10, Hotel Astor, New York.

W. S. and A. J. Townsend, who have made advertising history with their research institute, have joined the pioneer automotive advertising agency of Calkins & Holden, New York. The agency has been identified with the advertising testing firm for several years.

Production

(*Continued from page* 89)

approximately 335,000 cars and trucks and with two production days still to go the January total is now expected to be near the 375,000 mark.

Sales reports for the second 10 days of January are expected to show a slight falling off from the first 10 days because of weather conditions prevailing in important marketing centers, although some manufacturers indicate that sales during the period may equal or even exceed those of the intitial 10-day period. In practically all instances production has continued to be geared closely to sales with field stocks in excellent condition and used car inventories on the increase but not dangerously so.

Barring unforeseen developments in the general business situatioh and the possibility of work stoppages resulting from the definite split-up of the UAW into two competing factions, weekly schedules during February are expected to remain close to the current level which means that production during the month should total somewhere between 325,000 and 350,000 units with the latter figure entirely possible if an early spring arrives.

As indicated above, a midweek check of production schedules for the week ending Jan. 28, shows that total car and truck production will exceed 85,000 units for the third successive week. General Motors divisions were expected to contribute more than 33,000 to this total with Ford divisions adding approximately 23,000 and Chrysler with some divisions continuing their five-day schedules, accounting for aproximately 21,000.

Official figures just released by the U. S. Dept. of Commerce place U. S. and Canada production for December at 407,016 units and the total for 1938 at 2,655,777 units of which 2,126,066 were passenger cars and 529,711 were trucks. Current estimates of 1939 production with anticipated increases ranging from 25 to 35 per cent place anticipated output for the year between 3,315,000 and 3,500,000 units.—J. A. L.

Automotive Industries

Summary of Automotive Production Activity
(Week Ending Jan. 28)

BUSES Rate of operations generally steady at somewhat under 50 per cent capacity. One producer comments "Backwash hasn't gone through the shop yet, but when it does we expect our production rate to go up considerably."

TRUCKS Several sources indicate that inquiries from larger users are slowing down a little. Some of the smaller makers report, however, a slight increase in interest of potential purchasers.

TRACTORS Manufacturing activity in this field has levelled off and there seems to be no anticipation of any radical change in the very near future.

AUTOMOBILES The industry completed its third consecutive week with output ranging between 85,000 and 90,000 units. Outlook for February points to a total of 350,000 for the month, while current estimates of 1939 production anticipate an output of 3,500,000.

MARINE ENGINES Several important deals are said to be pending. Sentiment seems to be that "on the whole business looks good."

AIRCRAFT ENGINES This field continues to be the bright spot in powerplant sales, as commercial orders and export requirements are keeping factories busy. No immediate let-up is expected by the large engine builders.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

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Quo Vadis?

In his annual report to stockholders of the Detroit Edison Co., Alex Dow, president, remarks: "Eleven years ago our statisticians, using a formula which had been valid for some six preceding years, made an estimate of the output to be called for in 1938. That estimate was 5,732,000,000 kilowatthours. The actual figure was 2,689,403,500 kilowatthours, about half of what was predicted.

"Experience has taught us that we must plan ahead, but that neither the intricate devices of the statistical mathematician, nor the visions of those who evolve prophecies from their inner consciousness, can penetrate the veil that guards the future. . . . Business activity is increasing. Our hopes for the nearer future are high. Nevertheless, we hold ourselves prepared to deal with a swing in either direction.

Stewart Motor Corp. Plans to Dissolve

The Stewart Motor Corp., truck manufacturer, intends to go out of business because its operations have been unprofitable since 1931, according to an announcement made at headquarters of the company in Buffalo. Stockholders will vote at the annual meeting Feb. 14 on a proposal to liquidate the business and dissolve the company.

URW Sends Plea To UAW Officers

Disputing Factions Urged "To Forget Differences"

At an emergency session held in Akron Jan. 23, national and international officers of the United Rubber Workers Union of America, a CIO affiliate, issued a vigorous plea to executive officers of the dispute-torn United Automobile Workers Union "to forget their differences and join hands in the big job ahead of us, and to speedily settle the dispute in the name of America's labor movement."

The letter from URW chieftains to UAW officers declared that "automobile corporations, encouraged by the dispute within the UAW ranks, are attempting to compel various rubber companies to adopt anti-union tactics toward the United Rubber Workers, and in some instances, have attempted to dictate violation or modification of written contracts with our organization."

"Primary responsibility for stopping the anti-labor drive rests upon the disputing groups in the United Automobile Workers," the letter continued, asking these groups "to join hands again, as you did when your union was formed, and rededicate your union, as you dedicated it then, to a better and freer life for your members and your families."

Case Earns $2,422,372

Net income of J. I. Case, makers of farm machinery, was $2,422,372 in the fiscal year ended Oct. 31, 1938, compared with $3,894,356 in the preceding year. The decline in profit could be attributed to several factors, a recent report said. Sales volume for the 1938 fiscal year was smaller. The costs of manufacture were higher than in 1937 because of higher taxes, wages and material costs.

Acme

For Aerial Photography

A new type of airplane designed for aerial photography work with engine in the rear to give pilot and cameraman maximum vision from a glass-front gondola. Invented by Talbert Abrams, the plane has a top altitude of more than 30,000 ft.—twice as much as that attained by planes now used for the purpose. The additional altitude will make it possible to photograph four times the area encompassed by the camera's "eye" at 14,000 ft.

Hudson Retail Sales Cracking '38 Records

Hudson retail sales in the United States for the first half of January were 26 per cent higher than for the same period a year ago.

$500,000 Order for 50 Buses to Mack

One of the largest orders for motor buses in recent months, involving an expenditure of over $500,000 and calling for 50 Mack buses has been placed with Mack Trucks, Inc., by B. J. Kallen, president of the W. F. Transportation Co. of New York.

The buses, of 40-passenger capacity, with deluxe seating equipment, are to be delivered in time for the opening of the New York World's Fair and will be used in direct express service to the Fair Grounds from a terminal located on West Fiftieth Street between Sixth and Seventh Avenues, adjacent to Rockefeller Center (Radio City).

Passenger Car Production by Wholesale Price Classes (U. S. and Canada)

Twelve Months 1938 and 1937 Compared

	Twelve Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
Under $750	1,881,463	3,790,317	− 50.3	88.49	93.15
$751-$1000	213,176	231,716	− 8.0	10.03	5.69
$1001-$1500	25,207	30,807	− 18.0	1.19	.76
$1501-$2000	3,661	11,633	− 68.6	.17	.29
$2001-$3000	2,152	4,052	− 47.0	.10	.10
$3001 and over	407	410	− 1.0	.02	.01
Total	2,126,066	4,068,935	− 47.7	100.00	100.00

Truck Production by Capacities (U. S. and Canada)

	Twelve Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
1½ Tons and less	491,876	884,063	− 43.3	92.86	93.30
2 to 3 Tons	19,178	37,506	− 49.0	3.62	3.96
3½ Tons and over	9,633	13,844	− 30.5	1.82	1.46
Special and buses	9,024	12,089	− 25.2	1.70	1.28
Total	529,711	947,502	− 44.1	100.00	100.00

Calendar

Conventions and Meetings

SAE National Aeronautic Meeting, Washington ..... March 16-17
American Foundrymen's Association, Forty-third Annual Convention, Cincinnati ..... May 15-18
SAE World Automotive Engineering Congress ..... May 22-June 8

Shows at Home and Abroad

Berlin, Germany, Automobile Show, Feb. 17-March 5
Sixteenth International Automobile Exhibition, Geneva, Switzerland, March 3-12
A.S.T.E. Machine and Tool Progress Exhibition, Convention Hall, Detroit ..... March 14-18
Yugoslavia, Belgrade, Automobile Salon ..... April 1-8
Great Britain, London, Automobile Show ..... Oct. 12-21
Great Britain, London, Commercial Automobile Transportation Show, Nov. 2-11
Great Britain, Glasgow, Scotch Automobile Show ..... Nov. 10-18
Italy, Milan, Automobile Salon, Oct. 25 to Nov. 11

Year-End Survey Shows Slash In Dealer Stocks Compared With '37

N.A.D.A. Reports Inventories of Used Cars Down 18%, and New Cars Reduced 35%

Used car inventories of automobile dealers as of Dec. 31, 1938, were approximately 18 per cent lower than for the same date one year previous, while new car stocks were reduced almost 35 per cent, according to the results of a survey released by the National Automobile Dealers Association.

The survey, which was compiled from the reports of 725 automobile dealers, representing all makes of automobiles, and covering every section of the United States, and who accounted for 5 per cent of all sales in 1938, showed 29,710 used motor vehicles on hand on Dec. 31, 1938, compared to 36,114 on Dec. 31, 1937. New car inventories, at the close of 1938, were reported as 13,529 as against 20,717 one year previous.

Current used car stocks, which averaged 45 units per dealer, also represented a 45-day supply in the present market. Sixty-one per cent of the dealers stated that present used car stocks were excessive, 35.5 per cent said they were normal and 3.5 per cent reported less than normal inventories.

Despite the reduction in unit inventories as compared to a year ago, the survey points out that many dealers state their used car dollar inventory is not reduced proportionately, due to the fact that current stocks represent a larger percentage of later model, higher-priced used cars.

The average dealer reporting in the survey is about three times larger than the average of all automobile dealers, according to the survey, which estimates national used car stocks in the neighborhood of 650,000 units at the present time. A year ago they were estimated around 800,000 units.

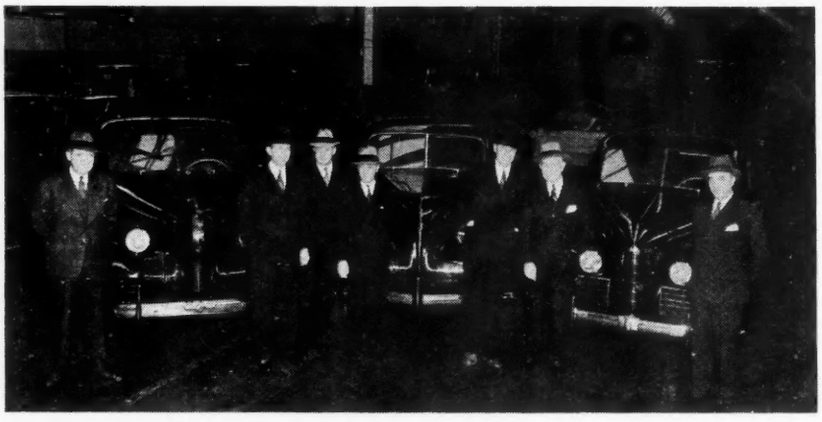
Record Automotive Sales In Sweden During 1938

Reports to the Commerce Department are that automotive sales records were broken in Sweden during 1938, climaxing consecutive records made in the preceding four years.

For the first 11 months of 1938 the cumulative rate of increase of sales over 1937, as measured by registration returns, was 30 per cent in the case of passenger cars and 5 per cent in the case of trucks and buses. The rise in sales was entirely accounted for by the sales of cars of European manufacture, the report stated.

Divco Reports Profit

For two months' operations ended Dec. 31, Divco-Twin Truck Co. reported an estimated net profit of $11,636 after provision for all charges and taxes. This compares with a net loss of $32,161 for the corresponding period of the preceding fiscal year.



100,000 Cars at Linden

On the occasion of the assembly of the one hundred thousandth unit at the General Motors plant at Linden, N. J., officials of the eastern regions visited the plant. Reading left to right: M. C. Thompson, zone manager, Pontiac Motor Div.; V. A. Davidson, regional manager, Pontiac Motor Div.; W. S. Roberts, general manager, Linden Div.; A. E. DeLoach, zone manager, Buick Motor Div.; H. J. C. Miller, regional manager, Buick Motor Div.; William Crossley, zone manager, Oldsmobile Div.; and F. Quinn Murphy, regional manager, Oldsmobile Div.

U. S. Scene

On-the-spot descriptions of The American Scene are being recorded by NBC for short-wave transmission to Latin America and by an agent of the French government for reproduction over the official French broadcasting system. Entitled "Life and Industry in America," the recordings will dramatize descriptions of diversified subjects from the Washington monument to the production of an automobile. Commentators have toured the Ford Rouge plant with portable microphones, recording the views of Edsel Ford on the eight-hour work day and spare-time gardening, the rumble of railroad cars loaded high with steel sheets on their way to the press shop, the voices of Ford workers who speak French, Spanish or Portuguese, and finally the hubbub of the assembly line. It is said that the scope of the broadcasts will include more than 80 countries.

Men

At a meeting of the board of directors of United Specialties Co., held Jan. 20, the resignation of **Christian Girl** as president, director and general manager was accepted. **M. D. Harrison,** who resigned as secretary and treasurer, was elected president and general manager.

John T. Beatty was elected vice-president, in charge of the United Air Cleaner Division, and **Ernest K. Williams** was elected vice-president, in charge of the Mitchell Division. **George Brill** was elected secretary and **A. Vander Meulen** was elected treasurer. **Hazel A. Eberle** was appointed assistant secretary. The vacancy created by Mr. Girl's resignation as a director was not filled.

Clarence Reese has been elected vice-president and general manager of the Continental Motors Corp. He was formerly vice-president and assistant general manager.

Merritt D. Hill, former assistant general sales manager of United Motors Service, will assume directorship of the company's newly created merchandising department. **L. W. Martin,** manager of the New York branch, has been promoted to Mr. Hill's former position at the general offices in Detroit.

The Heppenstall Co., Pittsburgh, Pa., has announced that **C. W. Heppenstall,** since 1920 president and treasurer of the company, has become chairman of the board of directors, and that **R. B. Heppenstall,** formerly vice-president and general manager of sales, has been elected president. The latter's vacated

position has been taken by **S. B. Heppenstall, Jr.**, who has been assistant manager in the sales department. **C. W. Heppenstall, Jr.**, formerly general manager, has been made vice-president in charge of operations. **G. F. Ritenbaugh**, secretary of the company, also has been made treasurer. The company specializes in the manufacture of forged products from high-grade alloy and carbon steel, including shear knives and die blocks.

R. D. Koenitzer has accepted the position of sales engineer with Young Radiator Co., Racine, Wis. Mr. Koenitzer was formerly chief engineer, Perfex Corp., Milwaukee.

Fred E. Bishop has been named general sales manager for the Graham-Paige Motors Corp., Detroit.

James H. Critchett and **Francis B. Morgan** are newly elected vice-presidents of the Electro Metallurgical Co., unit of Union Carbide and Carbon Corp.

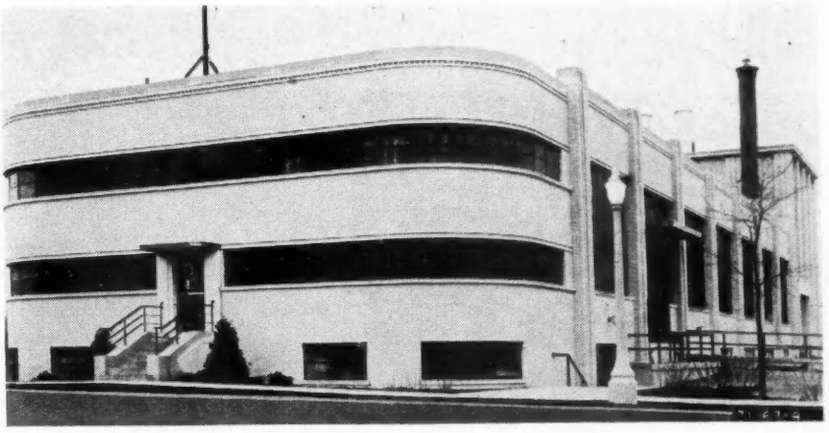
E. E. LeVan has been elected vice-president of the Haynes Stellite Co., unit of the Union Carbide and Carbon Corp. Previous to his promotion, Mr. LeVan was general sales manager.

David E. Anderson, formerly chief engineer of the Bonn Aluminum & Brass Corp., Detroit, is now associated with the Holley Carburetor Co., Detroit, as research engineer.

E. W. Isom, Sinclair Refining Co., New York, has been appointed 1939 chairman of the Automotive Survey Committee of the American Petroleum Institute. **R. P. Anderson**, of the Institute staff, has been named secretary.

Robert W. Lea has been elected a vice-president of Johns-Manville Corp. and will assume the duties of this office about March 1. Mr. Lea was formerly president of the West Virginia Coal & Coke Co. He will be in charge of finance.

John M. Frier has been named district sales manager for Studebaker Corp. in the South Bend area. Mr. Frier will maintain headquarters in Louisville, Kentucky.



Village Industry

The twelfth unit in the Ford Motor Co.'s network of small plants in rural Michigan is this $600,000 carburetor factory recently put into production on the banks of a stream in the village of Milford. All manufacturing equipment in the Milford plant is new. It was set up and operated in the Rouge plant at Dearborn while the Milford plant was under construction, then the entire department was moved from Dearborn to Milford between four o'clock on a Friday afternoon and eight o'clock the following Monday morning. Initial production is said to be at the rate of 1700 carburetors a day, and this will be increased somewhat as operations are smoothed out.

Moritz Kahn

Moritz Kahn, vice-president of Albert Kahn, Inc., architects, died from a heart attack on Jan. 16 while aboard a train on his way to New York from Detroit. A civil engineering graduate from the University of Michigan, Mr. Kahn is credited with numerous inventions in the construction field.

Passenger Car and Truck Production

A rising tide of passenger car and truck production in the United States and Canada lifted the December total to 407,016 units, approximately 4.2 per cent above the preceding month's mark. Output in the final month of 1938 topped the 1937 volume for the same period by slightly more than 17 per cent.

For the 12 months January to December, 1938, inclusive, production aggregated 2,655,777, or roughly 47 per cent less than the 1937 record.

	December 1938	November 1938	December 1937	Twelve Months 1938	Twelve Months 1937
Passenger Cars—U. S. and Canada					
Domestic Market—U. S.	305,900	295,366	212,655	1,810,629	3,643,386
Foreign Market—U. S.	20,106	24,978	31,730	190,156	272,503
Canada	15,518	15,423	14,799	125,081	153,046
Total	341,524	335,767	259,184	2,126,066	4,068,935
Trucks—U. S. and Canada					
Domestic Market—U. S.	48,252	38,771	52,215	352,314	689,674
Foreign Market—U. S.	14,088	13,298	29,634	136,336	203,411
Canada	3,152	2,569	6,316	41,061	54,417
Total	65,492	54,638	88,165	529,711	947,502
Total—Domestic Market—U. S.	354,152	334,137	264,870	2,163,143	4,333,060
Total—Foreign Market—U. S.	34,194	38,276	61,364	326,492	475,914
Total—Canada	18,670	17,992	21,115	166,142	207,463
Total—Cars and Trucks—U. S. and Canada	407,016	390,405	347,349	2,655,777	5,016,437

December Excise Taxes On Trucks Above 1937

Excise taxes collected in December, 1938-1937, on sales of automotive products, oil and gasoline, are reported as follows:

	1938
Automobile trucks	514,718.92
Automobiles and motor cycles	2,834,209.61
Auto. parts and accessories	704,021.66
Tires	2,403,352.78
Inner tubes	471,906.72
Lubricating oils	2,109,251.55
Gasoline	16,936,817.83

	1937
Automobile trucks	456,077.63
Automobiles and motor cycles	7,091,823.00
Auto. parts and accessories	955,919.32
Tires	3,147,641.14
Inner tubes	605,674.30
Lubricating oils	2,558,476.42
Gasoline	17,585,707.17

Continental Motors Has Big Volume of Orders on Hand

Continental Motors Corp. reports unfilled orders on hand in excess of $2,875,000 for airplane engines, agricultural power units, engines for air conditioning units, and for electric generator sets.

40 Years Ago

J. Moodie, Jr., Hamilton, Ont., who has driven a gasolene carriage several thousand miles and is highly enthusiastic over it, states that he never has any trouble with the pneumatics on the steering wheels, but that on a hot day the pneumatics of the driving wheels are apt to give trouble because the air in them heats under the friction of the road and expands, rendering them liable to burst. As a preventive of this he recommends that the rear tires be examined occasionally when the day is very warm, and, if they are found too hard, that a little air be let out.—From *The Horseless Age*, January, 1899.

Sterling Motors Corp. to Open New Factory Branch

Sterling Motors Corp., Milwaukee, which acquired the assets of the truck division of the Fageol Truck & Coach Co. of Oakland, Calif., on Nov. 1, 1938, is opening a factory branch at 470 Bayshore Boulevard, San Francisco, on or about Feb. 1 to serve both Sterling and Fageol owners in Northern California and the Pacific Northwest. At the present time, sales and service are handled from the Fageol factory at Oakland. While the manufacture of Fageol trucks was discontinued Jan. 1, a complete stock of service parts for all model Fageol trucks will be maintained at all times. The new Sterling factory branch is to be under the supervision of L. A. Lundstrom.

General Tire Reports Profit for 1938

The General Tire and Rubber Co. has reported a net profit of $1,181,224.18 for the fiscal year ended Nov. 30, 1938, after provision for Federal normal income tax and surtax on undistributed profits. For the previous year, net profit amounted to $808,913.41.

The annual meeting of stockholders of company will be held at the general offices in Akron on Feb. 7, at which time directors will be elected for the ensuing year.

Caterpillar Earnings

B. C. Heacock, president of Caterpillar Tractor, has reported that the company's earnings for the year ended last Dec. 31, were $3,235,709. In 1937 profit was $10,168,090.

However, operations in the last 1938 quarter were more profitable than in the last 1937 quarter, Heacock said. Profit in the last three months of 1938 was $1,163,607, against $1,032,754 in the corresponding 1937 period.

Revere Completes New Mill at Rome, N. Y.

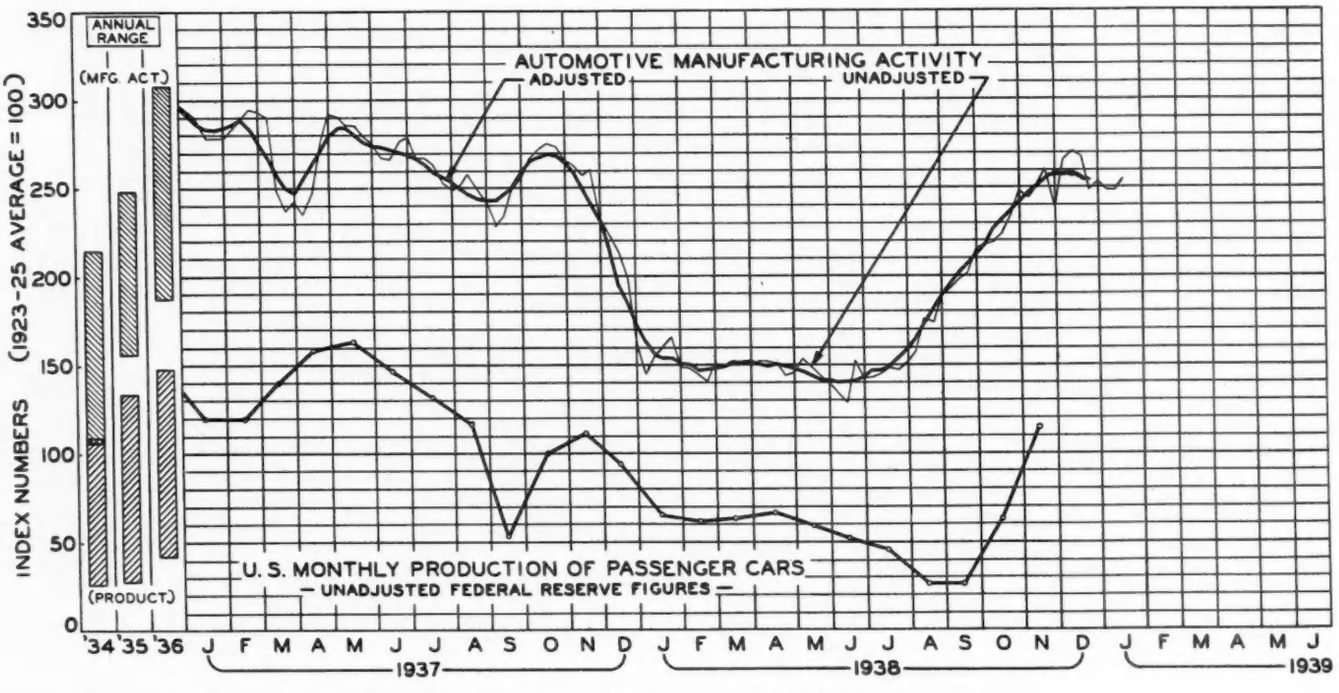
Revere Copper & Brass, Inc., has announced completion of a $3,250,000 brass and copper mill at Rome, N. Y., as part of a huge modernization program. The mill has a monthly capacity of 2,000,000 lb. of brass strip up to 20 in. in width and its compactness is indicated by the fact that this capacity is contained within a floor area of 72,000 sq. ft.

United Motors' New Merchandising Plan

An extensive merchandising program for Hyatt and New Departure bearings has been inaugurated by United Motors Service. At sales meetings held recently in each of the organization's 21 branches, the program was outlined by special general office representatives, M. D. Hill, H. C. Nelson, S. H. Hilleboe, Paul Graham, S. P. Hayes and W. E. Haden.

Sales representatives of the various branches during the next month and a half will contact authorized bearing distributers to explain the program. Elements of the plan include greatly increased availability of the merchandise, new working tools, modern sales helps, a spring stocking schedule and a sign and identification scheme.

Downward Movement Reversed as Index Goes to 254



The unadjusted index of automotive manufacturing activity for the week ended Jan. 21 reversed the downward movement of the preceding two weeks to reach 254, six points in advance of the index figure for the week ended Jan. 14.

The heavy black line tracing the adjusted index points steadied at the 255 mark, only 1 point below the level indicated for the week ended Dec. 24.

Just Among Ourselves

"Blessed Events" Are Expected

ANNUS mirabilis—a wonderful year—is the forecast for the remainder of 1939. And in keeping with the medieval note which opens this paragraph, it may be remarked that an air of almost medieval secrecy surrounds the fact that three new cars are almost certain to be born into the market during the year. Two of them will extend the market coverage of existing manufacturers with cars that are lighter and less expensive than those being marketed in their current lines. One is expected from a source outside the industry, but its parentage is of such a character to indicate that the new arrival's christening party will be attended by the best people.

There are now so few individual producers in the automobile industry that any year which sees the introduction of three new types of cars, even though two of them are but additions to or extensions of present lines—is a year to be watched and remembered.

With a Dash Of Optimism

FURTHERMORE. An important government source has been insisting for several months that motor-vehicle production for 1939 would probably go very close to the 4,000,000 unit mark. When this figure was first offered to a breathless group of editors, it was received skeptically. A good January has caused the skepticism to dwindle, and most automobile sources are accepting 4,000,000 units as the production figure for 1939. As *Fortune* points out in its February issue, in an article on the sales activities of General Motors, there is a difference between sales expectancy and the sales quota. In fact, *Fortune* says, quotably, that the sales quota is the sales expectancy plus a dash of optimism.

We feel the same way about a production figure of 4,000,000 units. We feel it's a production-quota figure and not a real expectancy figure. Nevertheless, it will be a wonderful year in comparison with 1938, and we're in favor of it.

Railroading Cuts The Automotive Horizon

THE excitement of last November's election day submerged for a little the sequelae to a full page advertisement which appeared in the Chicago Daily Tribune for November 4. Headed "The Railroad Problem Is the Nation's Problem," the advertisement went into explicit detail about the "Hastings plan for postalizing transportation rates."

Under the Hastings plan, the United States would be divided into transportation zones. Rail transportation for passengers and freight within a single zone would be charged for at a flat rate per trip, regardless of the distance involved. Trips between zones would involve a simple multiple of the basic rate, according to the number of zones penetrated.

Passenger coach travel between Oceans could be had for $5, according to the sensationally low rates used as examples in the advertisement. There would be extra charges for de luxe service of any character or for travel on "limited trains."

Operation of the plan, in the sponsors' view, would be accomplished best by changing the Interstate Commerce Commission into a railroad authority. Such an authority could exchange its securities for railroad securities, and lease the properties back to private management, for operation.

There isn't enough space here to discuss fairly all the modifications and details of the basic thesis presented by John A. Hastings, the author of the plan. The important thing for the moment is that it has enough organized backing to demand successfully its further study by the Interstate Commerce Commission and a committee of the Senate. It has churned up quite a lot of reaction, pro and con, already, and during the next few months a good many associations concerned with such problems will be passing resolutions about it.

How does it concern the automotive industry? If such a plan were put into effect, it would have a tendency to discourage buses, trucks, and to a certain extent passenger automobiles as instruments of long distance transportation. The sponsors of the plan recognize this, and visualize buses and trucks becoming feeders to railroad lines on an augmented basis. No matter how low the flat rate within a zone might be, it would be relatively high for travel for distances of say, 50 to 75 miles, in view of present rail rates. Such distances might become the normal operating range of buses and trucks. Beyond the local distances, the low cost of rail movement would tend to force traffic to the rails. There would, of course, be a sort of twilight zone where a slight rate differential between rails and other means of transportation would be compensated for by superior flexibility of buses, etc.

It is stated openly in connection with the plan that important bus-manufacturing interests are supporting it financially, which indicates offhand that a tremendous increase in short-haul bus operations is visualized by them. Subject to additional information from the sponsors of the plan, we can't see it. The whole business reminds us slightly of wrecking a house to get at the mice in the attic.—HERBERT HOSKING.

Dealers Sitting Tight

. . . and awaiting the next factory plays in connection with liberalized contracts and round-table attempts to solve their problems. Survey finds wide approval of the literal statements of recent factory-dealer plans, but a tendency to withhold judgment on their efficacy until after the spring selling season.

By PHILIP H. SMITH

WITH the signing of liberalized automobile dealer-factory contracts,* the Peace of Detroit is in effect, but let no one delude himself that peace is permanent.

The policy of appeasement, which is reflected by liberalization of these contracts and by the institution of exclusive sales territories, is welcomed by the dealers. It has gone a long way toward improving dealer-factory relations. However, factory sincerity is suspected and if this sincerity proves to be lacking, there will be an explosion six months or so from now. The dealers are seething.

It takes all kinds of dealers to make an automotive world and there is little unanimity in thought. There are some generalities, however, which can be stated honestly:

- Exclusive sales territory provisions are liked by all but a very few small dealers.
- The new contracts are not being taken very seriously.
- Dealers have resolved to go their own pace in selling new cars and to withstand all factory pressure.
- Legislation aimed at improvement of dealer-factory relations is in abeyance for the time being.
- The majority of dealers are discouraged with the outlook for profitable operations.

Comment upon closed territories, secured territory, or whatever one chooses to call these variously constructed game preserves, is widespread. All the agreements seek to keep the dealer in his own green pastures and penalize poaching in preserves that look a little greener just beyond. Naturally, comment upon this policy is not all friendly. Much as the vast majority of dealers would like to see the new provisions work, they doubt that the manufacturers are really eager for any restriction and they suspect that more words than action will be applied to make them effective. Will the dealer have to run around checking up on violators? Will he have to make a fight to collect infringement penalties? What about the many loopholes? He wants to be certain that there are teeth in the policy and if there aren't any teeth, the whole matter is a very unpleasant joke, because it will penalize the honest, cooperative dealer. He thinks that the penalties, which now run somewhere between 25 and 50 dollars, are too low to be effective and should be promptly raised to $100.

The new contracts in themselves mean very little to the dealers. Certainly, no one of them has thrown his hat in the air after reading clear through. He has scanned them to find indications of a friendlier attitude on the part of the manufacturer, rather than to find panaceas for his ills. He concludes that liberality is all on the side of making it less painful when he goes out of business, none of it on the side of making it easier to stay in business. There is a widespread belief among dealers that no contract ever written gave the dealer help and that it is folly to expect any change for the better.

Granted that no recent act of the manufacturer has been taken at full value, there is a strong tendency to give him the benefit of the doubt for some months to come. The dealers are keeping their fingers crossed until after the spring selling season, because they figure that's the time when the manufacturer will exert pressure and forget the dealers' interests if he hasn't changed his attitude sincerely. From the standpoint of dealer-factory relations, therefore, the next few months are going to be critical. If declarations of aid and comfort are backed by sincere factory effort to help the dealers, the severing of diplomatic relations may be postponed for some time to come.

These complaints and suspicions cannot be dismissed with the curt reply that dealers always complain and always are suspicious no matter what the situation. Regardless of

* AUTOMOTIVE INDUSTRIES, Jan. 8, 1938, p. 35, "GM Forms Dealer Board"; Feb. 18, 1938, p. 219, "Chrysler Clarifies Dealer Contract"; April 16, 1939, p. 533, "GM Dealer Council Plan to Be Extended"; July 23, 1938, p. 95, "Ford Dealer Plan".

justification, the attitude is genuine and influences operations. Complaints are facts to be considered. The underlying dissatisfaction is born of the belief that existing, unprofitable conditions are permanent; not to be banished by an upturn of business. The dealers experienced good business in 1936 and early 1937 only to have accumulated profits swept away by the slump and repossessions which followed. They feel that another big year from a volume standpoint might be their final undoing. Therefore, dangling the carrot of a spring upturn before their noses leads their hopes nowhere.

It would be folly to attempt classification of these dealers according to their outlook and attitude. It cannot be said, for instance, that dealers who lose money are those who are sore. Complaint and bitterness is just as prevalent among those who

3000 Miles of "Road Testing" 175 Interviews

preceded this article, which skims the cream from the market gossip among dealers. It digests automobile dealer opinion from sales floors in eleven states; in big cities, in small towns. It covers all makes of automobiles.

The author's instructions were: "Stay with each dealer interviewed long enough until you can be sure he is giving you his honest opinions. Then report those opinions as you find them."

Previous articles in AUTOMOTIVE INDUSTRIES by Mr. Smith have demonstrated that he has a special ability to present the essentials of a turbulent situation in terse, unbiased terms. This article is no exception, and is commended to you by—THE EDITOR.

break even or better. There is no correlation between a dealer's attitude and the volume of his business, his earnings, location, or the product handled. The only correlation in evidence is that the more competent and thoughtful the dealer, the more he believes his own immediate interest in profit per unit of sale runs counter to the manufacturer's interest in more unit sales. Dealers of every stripe and hue are one in declaring that they are engaged in a racket; that the situation has been growing steadily worse, and most of them conclude that the alternative to quitting is to abandon hope of outside assistance and stress self-help.

The present attitude of the dealer organization amounts to a turning of the back upon the manufacturer. And this turning of the back brings him about-face to confront his own problems whether he likes it or not. This requires a bit of explanation. It would be inaccurate to say that dealers as a body have completely abandoned hope of an alleviating intervention. The hope exists side-by-side with the partially accepted belief that salvation has become a personal matter to be solved by individual means. There is always an operator in the same territory who does more than break even, and thereby provides an object lesson. There are always sporadic outbursts of cut-throat selling to suggest that the dealers themselves are not above reproach. These observations are adequate to keep self-help in mind where faith in it has not come by deep analysis.

The face-front orientation is accompanied by a keen desire to be let alone. If the manufacturer can't or won't help, he can at least refrain from imposing handicaps, say the dealers. Even when there is no direct criticism of factory relations, there is the hint that the pleasantest relations are those confined to infrequent sending of picture post cards. In Wisconsin, for example, the infrequency of calls from factory representatives ever since the state passed legislation, was listed as one of the blessings of 1938. This attitude finds its ultimate expression in a resolve to get into a financial situation which will permit a judicious thumbing of the nose toward the manufacturer, finance company, local banker and landlord. More than anything else, the dealer wants to be able to say "No" to all and sundry urgings from the manufacturer without loss of sleep. When he can say "No" on every count, he figures it will be time enough to consider any relaxation from the negative.

At this point it is pertinent to report that all criticism of the manufacturer is not accompanied by the waving of a red flag. There is a spoken appreciation of the difficulties which manufacturers face and many expressions of sympathy. Some dealers even go so far as to declare that the basic ills of distribution and manufacture are one and the same. But hand in hand with this attitude goes a strong hunch that personal problems come first and that too much sympathy with the manufacturer only leads to bankruptcy.

The hardening of the dealer's heart has been given great impetus by the widespread knowledge that the manufacturer can no longer pick dealers off bushes. Every county has provided an object lesson of the difficulties encountered in replacing representation when "volume" dealers have been swept away on a pile of old iron. It is fully appreciated that the combination of men, capital and willingness to engage in automobile retailing is hard to locate. You can't tell a dealer otherwise because many of them have tried to sell out.

This resolve to be hard-boiled like his maker (no irreverance intended) goes much further with the dealer than enjoying the thrill of telling the manufacturer where to get off. It involves a slow and painful adjustment to realities; an acknowledgment that he is not a retailer of new automobiles as he thought when he engaged in business, but rather that he is primarily a dealer in used cars, handling new cars as a side-line. He never thought very highly of the used car business, so this acceptance comes to him somewhat as a shock. Furthermore, that leads him to feel that his objectives have become very far removed from those of the manufacturer, and he thinks this creates a new uneasiness.

There is a vast no-man's land between admitting to being a used car dealer, and putting operations on such a basis. It is this no-man's land which is being stormed right now. Some dealers have just caught on to the idea and have gone no farther than to rue their altered status; others have made a few preliminary adjustments, and a limited number of dealers are actually operating on the new basis. This last and very select group have passed beyond the point of differentiating odiously between new and used cars to engage in the broader function of dealing in transportation. Herein they see the one hope of staying in business.

The crux of the situation today is, of course, the used car problem and the used car was yesterday's prob-

Direct Quotes

"In some ways I'm no better than the old time saloon-keeper—I sell gasoline to people I shouldn't."

"Saner business means fewer sales."

"Liberalization of contracts means nothing and never will. As soon as dealers realize this they'll want legislation."

"Automobile selling is a racket, no banker will touch the business and even landlords are suspicious."

"What we need is a Czar like Will Hays."

"The manufacturer is slowly getting wise to himself."

"Wisconsin has the right idea."

"Closed territory makes the difference of staying in business."

"What the country needs is really low-priced transportation."

"The new territorial provisions offer the first ray of hope in six years."

"Reforms must come by dealer becoming a merchandiser instead of a horse-trader."

"This business needs more brains."

"The small dealer is now getting better treatment than the big one."

"I could use an additional 2 per cent to cover the increased cost of doing business."

"The dealers know what's good for them but they won't take it."

lem. However, the increase in the number of used cars which must be sold before a profit or loss is obtained on the sale of a single new car and the corresponding multiplication of profit leaks, is what gives the used car problem enhanced meaning. Now more than ever before, the used car plays a dominant role, because the consumer is more interested in what he gets for his used car than in what he acquires in the way of any particular new product. The dealers blame the manufacturer for the lack of spread in price classes and for the similarity of products, but it is a half-hearted, not too sincere, fault-finding. They suspect deep down in their hearts that the shift from selling new merchandise to the buying of old was of their own doing. Incidentally, this explains why there is no serious demand for larger gross margins and no real complaint about slow deliveries from the factory—"the larger gross," it is admitted, "would be used to buy junk," while "available new cars would simply have meant larger used car inventories at a bad season of the year."

The despair which the situation creates is manifested in any number of sharp criticisms. The dealers declare that the manufacturer strives for an unattainable volume; that the market cannot absorb output at a profit, that the cost of present-day automobile transportation is too high, and that the manufacturer has educated the public to trade in before a reasonable amount of use has been had. To counter this, they will, if they can, bring about a limitation of volume by refusing to handle trades which offer no real promise of being executed at a profit. They hope for the strength of will to hold down appraisals and to keep used car inventories low. And they declare that if they can hold to their purpose through the spring selling season, they will have shown their mettle. If they don't succeed, used car lots will be paved with good intentions.

It is all a very grim business. Suppose the dealer does insist on a profit per unit of sale, does this guarantee salvation? The dealer thinks not, although it is the best he can do, and that's why attempt at sane operation fails to bring complete peace of mind. While he realizes full well the folly of buying used cars at exorbitant prices merely to get new cars into consumer channels, if he refrains, he knows some other dealer will get the business. Nor does it comfort him to know that the other dealer will trade himself completely out of business, because a new wildcatter will step into the bankrupt's shoes and continue the war of attrition "until the last sucker is parted from his capital."

The foregoing raises the question of legislation. Will the dealers resort to the courts to bring about better operating conditions, either by minimizing the force of unrestrained competition or by curbing factory domination? This much is certain by way of an answer—legislative agitation is in abeyance at the moment. Unquestionably, the softening of factory attitude has been mainly responsible for lessening the pressure for laws. The dealers say that the Government's interest in the situation and the blow-up in Wisconsin have had a very salutary effect upon the manufacturer, perhaps adequate. But if the next few months reveal that the manufacturer doesn't mean what he says, that there isn't any change of heart and that pressure and coercion are resumed, then there will be no hesitancy about resorting to legislation to bind the manufacturer. Legislation per se is not liked by the majority of dealers and almost any alternative is preferable, but the number of dealers who fall into the class typified by the remark, "I'll be d—— if I'll let anyone tell me how to run my business," is much smaller than those who would subscribe to this comment: "I can see no choice between industrial dictatorship and political dictatorship. If we had the latter it might hold the manufacturer in check."

The fact is, dealers don't know just what kind of legislation they want, if for no other reason than what they could want might not be workable. They also lack competent leadership and the willingness to get together. At best, the typical dealer is an uncooperative person and too many of them see legislation as something to profit by through non-observance. In Pennsylvania, attempted legislation went down to defeat on the grounds of being unconstitutional; in Ohio, the Auto Dealer and Salesmen's License law is criticized because enforcement powers have not been employed to curb the unfair practices for which the law was passed. This has made the dealers lose faith in the efficacies of legislation. And while they look back upon the days of N.R.A. as a very happy epoch in their lives, they don't see its return and they recall that even that bit of regulation was not observed with all honor.

Wisconsin is unique in having won through to legislation which is overwhelmingly approved now that it is

(*Turn to page* 113 *please*)

From the Dealers

"To sell only at a profit means to get out of auto selling."

"You can have any dealership in this town at cost."

"The trouble with business is there's too many golf courses."

"Best factory relations in 22 years of business."

"The finance company is now the dealers' banker."

"The finance company makes more per unit than the dealer."

"Used cars offer the only means to make money."

"The factory is more helpful."

"I've got the best factory relations in my history. They are a real help."

"I'd rather be in horse-trading. There's no hope of betterment."

"There's no solution other than good business methods."

"Legislation won't work because of human nature."

"If business gets worse, I'll go back to the farm. I like corn bread, could eat a heap of it, and I'm not afraid of hard work."

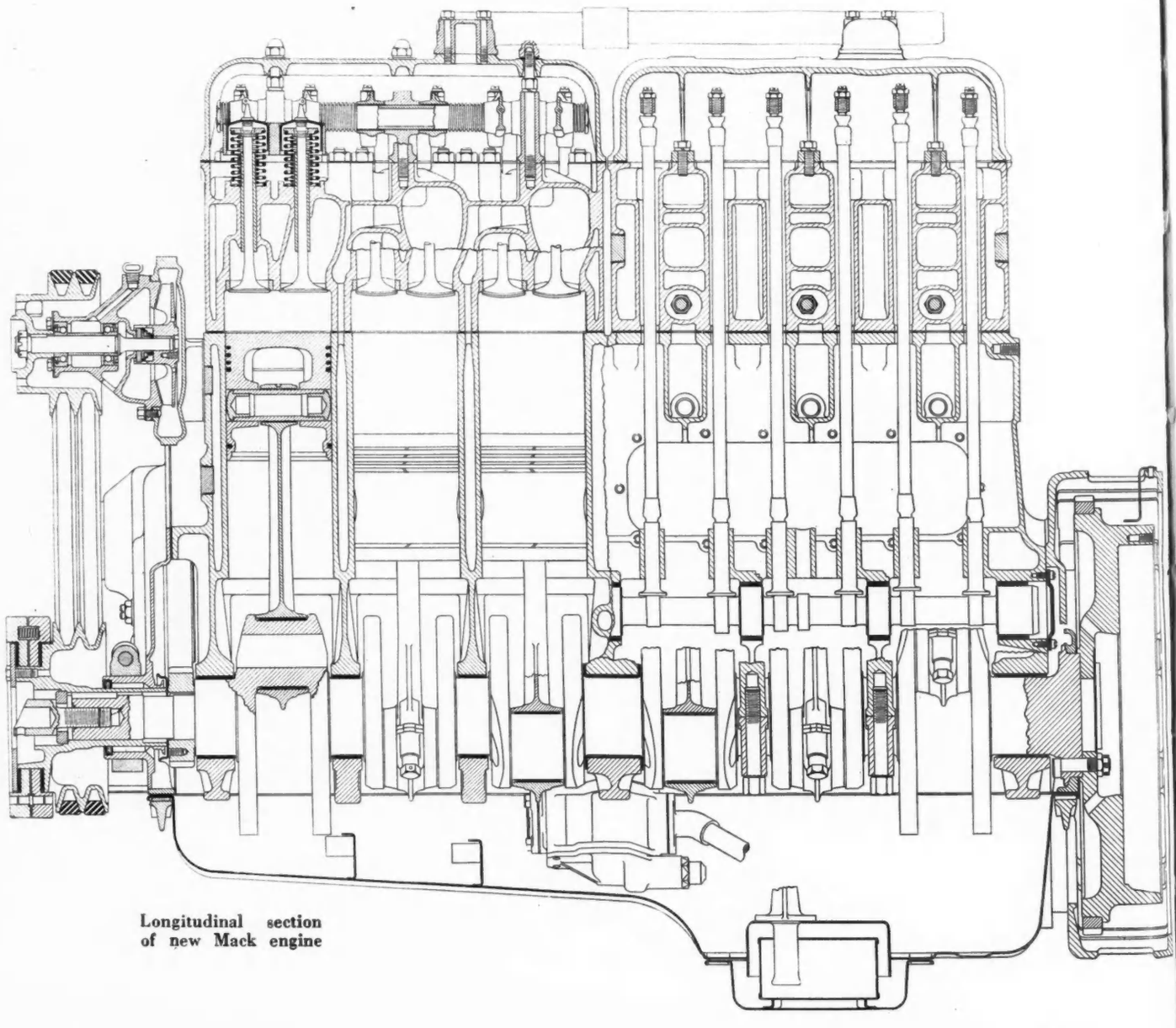
"Business won't get better until the dealers get together and stop cutting each other's throats."

" . . . and the man the factory turned up to buy me out turned out to have only $700 capital."

Mack Crankcase

A NEW series of commercial-vehicle gasoline engines was announced recently by Mack Trucks, Inc., and is to be known as the Thermodyne Series. These are six-cylinder engines ranging in output from 145 to 180 hp. Only the first of the series is ready for production at the present time. A novel feature is the arrangement of the combustion chamber, valves and porting, which is claimed to be such as to assure maximum turbulence together with high volumetric efficiency and smooth combustion.

Crankcase and cylinders are cast in a single block, a practice that is comparatively new in engines of this size, on account of the foundry problems involved. The Mack foundry in New Brunswick, N. J., solved these problems successfully. This integral construction makes for rigidity and



Longitudinal section of new Mack engine

and Cylinders in a Single Block

compactness. Full-length water jackets assist in cooling the crankcase oil.

The crankshaft is fully counterbalanced by twelve counterweights forged integral with it, and has 3½-in. main and 3-in. crankpin bearings. It is pack-carburized and case-hardened, as are the camshaft and timing gears. The cylinder block, crankcase casting and cylinder heads are made of a high nickel-chromium semi-steel and are heat-treated to remove shrinkage and machining stresses. Cylinder heads, which contain the valve ports and passages, are cast in two blocks of three each, each of these heads being held down to the engine block by twenty studs. The crankshaft is supported in seven thin-shell precision bearings, the front bearing being 1 11/16 in. long, the center bearing 2 7/16 in., the rear bearing 2⅜ in. and the four intermediate bearings 1¼ in. each. Connecting-rod big-end bearings are 2 3/32 in. long and are made of high-lead babbitt, with a steel back, these also being of the precision type.

The valves are slightly inclined in the head and are operated by the conventional rocker-arm mechanism through tubular push rods from the camshaft in the crankcase. They are of tulip form, with 30-deg. seats, and carry double, concentric valve springs. At their upper end these springs are surrounded by spring guides on which the side thrust due to the angular motion of the rocker arms is taken. The crankpins are bored out to reduce the size of the counterweights required to balance them. To make it possible to pass the connecting-rod heads through the cylinders, they are split at an angle of 35 deg. instead of the usual 90 deg., and the joint between rod and cap is effected by means of mortises and tenons and precision cap screws. Connecting rods have a center-to-center length of 12 9/16 in. or more than twice the length of stroke, which minimizes the side thrust on cylinder walls. Pistons are of aluminum alloy, of the cam-ground, T-slot type. An exceptionally thick head helps to carry off the heat rapidly. Each piston carries five rings.

The relatively high specific output, flexibility and economy of the engine are credited to the shape of the combustion chamber. As may be seen from the sectional views, over a certain section of the bore the piston head comes close to the flat bottom of the cylinder head at the end of the up-stroke, the greater part of the combustion chamber being in the form of a D-shaped domed cavity eccentric to the cylinder bore. Both valves open into this cavity, and the spark plug is located at what is claimed to be the most advantageous position from the standpoint of flame propagation and pressure rise. The shape of the combustion chamber, moreover, induces energetic turbulence.

Manifolding and porting problems have been worked out with a view to ensuring a minimum of resistance to gas flow and the best possible distribution. With the exception of the line to the oil gage on the instrument board, all oil piping has been eliminated. All crankshaft, camshaft and connecting-rod bearings, as well as the rocker-shaft bearings and bearings of the principal accessories, are lubricated by direct pressure feed. The oil filter and the air compressor (if used) are connected with the lubrication system of the engine by the same drilled passages within the block itself through which lubricant is supplied to other points. The main oil-distributing header, ¾ in. in diameter, is located immediately below the cylinder water jacket, so that the oil is warmed by the cooling water when starting from cold, and cooled by it in normal operation.

The three models of the series are known as the EO, EP and EY. They have cylinder dimensions of 4⅜ by 5¾, 4¾ by 5¾, and 5 by 6 in., making the piston displacements 518.6, 611.3, and 706.5 cu. in. respectively. All have a standard compression ratio of 5, though somewhat higher compression ratios are available. Compression pressures with the standard compression ratios are 105 lb. per sq. in. at 1000 r.p.m., 106 lb. per sq. in. at 800 r.p.m., and 106 lb. per sq. in. at 1000 r.p.m. The maximum horsepowers of the three models are 140 at 2300 r.p.m., 152 at 2200 r.p.m., and 170 at 2100 r.p.m. Outputs at governed speeds are as follows: 132 hp. at 2000 r.p.m., 145 hp. at 2000 r.p.m., and 166 hp. at 1900 r.p.m. Maximum torques of the three models are 365 lb-ft. at 1000, 426 at 900, and 500 at 800 r.p.m.

Considerable overlap is provided for in the valve gearing. Inlets open

Three Models EO, EP, EY

Displacements

518.6 Cu. In.
611.3 Cu. In.
706.5 Cu. In.

Cylinder Dimensions

4⅜ x 5¾ In.
4¾ x 5¾ In.
5 In. x 6 In.

Compressions

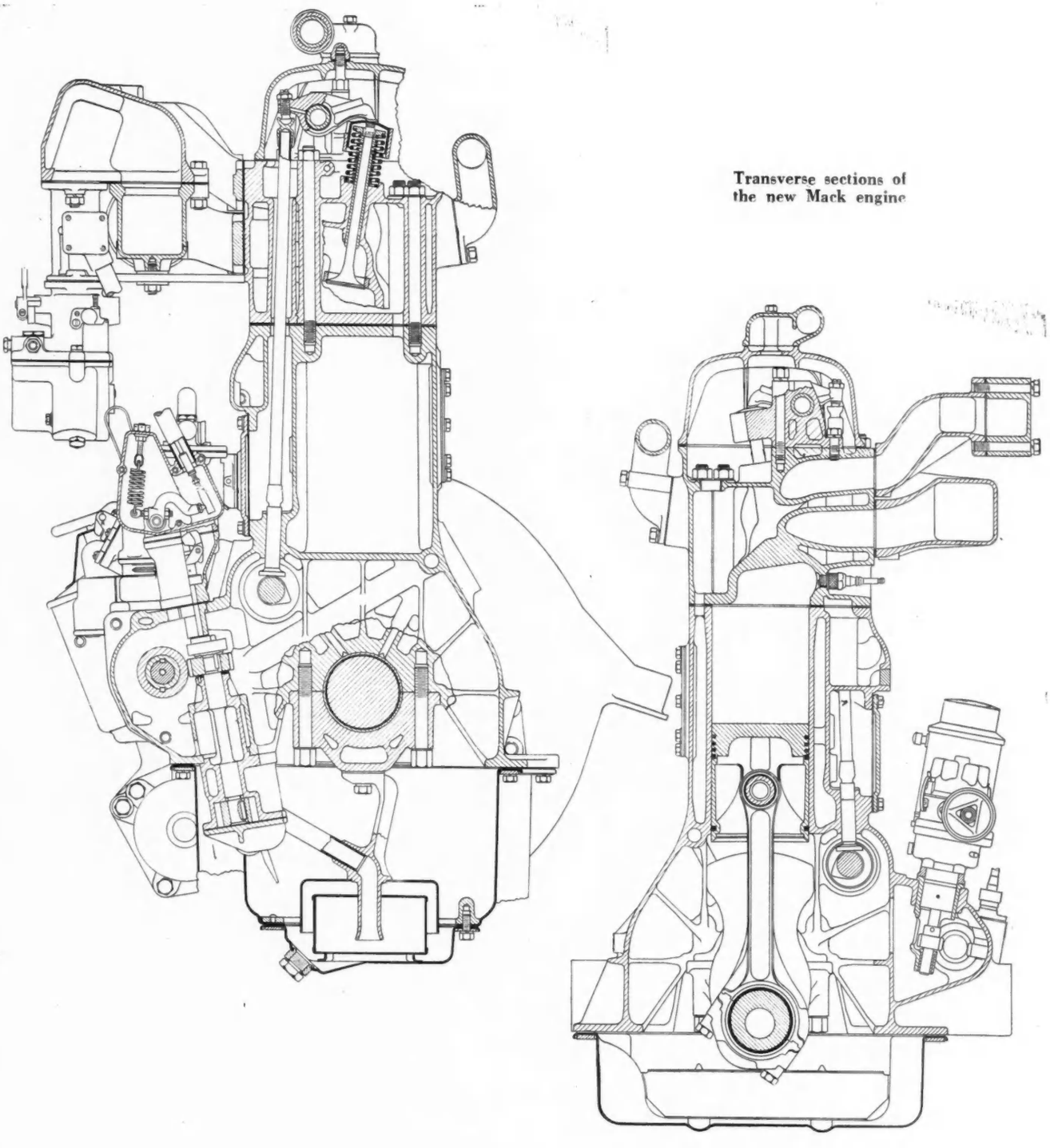
105 Lb. at 1000 r.p.m.
106 Lb. at 800 r.p.m.
106 Lb. at 1000 r.p.m.

Connecting Rods

12 9/16 in. center to center

Turn over to page 108 for other views

10 deg. ahead of top dead center and close 45 deg. after bottom dead center, while exhausts open 45 deg. ahead of bottom dead center and close 10 deg. after top dead center. All models have the firing order 1-5-3-6-2-4. Spark plugs are of the 14-mm. size. All models have up-draft carburetors; that on the smallest model has a 1¾-in. air pipe, while the two larger models have 2-in. carburetors.



Transverse sections of the new Mack engine

An explanation of the mode of operation of

Fluid Flywheels

By P. M. HELDT

NOW that hydrokinetic couplings (fluid flywheels) and transmissions (torque converters) are coming into use in this country in both possenger cars and commercial vehicles, an elementary exposition of their operating principles would seem to be timely. I have it from engineers connected with this development that they have encountered considerable difficulty in making the lay public understand the mode of operation of these devices, and the following is submitted as of possible help in this connection.

We will take up first the fluid flywheel or hydrokinetic coupling. This is sometimes referred to as a hydraulic coupling, but since there is also another type of hydraulic coupling or clutch in which the fluid does not circulate when the coupling or clutch is engaged, it is advisable to apply the term hydrokinetic coupling to the device here considered, in which there is liquid flow whenever at least one of its members is rotating.

Fig. 1 shows a cross section of the coupling in diagram. The device comprises two rotors, one connected to the driving shaft, the other to the driven shaft. Both rotors are provided with vanes which form between them cells or passages through which the working fluid may circulate. The disc or rotor *A* connected to the driving shaft is generally called the impeller, and the rotor *B* connected to the driven shaft, the runner, in accordance with the terminology of other types of hydraulic apparatus, such as centrifugal pumps and turbines. In the design here shown the impeller forms a housing of annular shape which is completely filled with a liquid. The driven shaft has a bearing in the impeller housing, and a suitable seal is provided to prevent escape of liquid through this bearing.

Now let us assume that the impeller *A* is being rotated by the engine, and that runner *B* is being held from rotation in some way as, for instance, by engaging the friction clutch back of the fluid flywheel and setting the parking brakes of the car. The liquid in the cells between the vanes of the impeller will participate in the rotary motion of the impeller and will be subjected to centrifugal force. Since runner *B* is being held from rotation, the liquid in its cells is not subject to centrifugal force; hence the liquid in the impeller, under the influence of the centrifugal force upon it, will leave the cells of the impeller near the outer circumference of the latter and enter the cells of the runner, and liquid thus displaced from the cells of the runner will enter the cells of the impeller near the inner circumference. This circulation of the liquid is indicated by the arrows in the drawing.

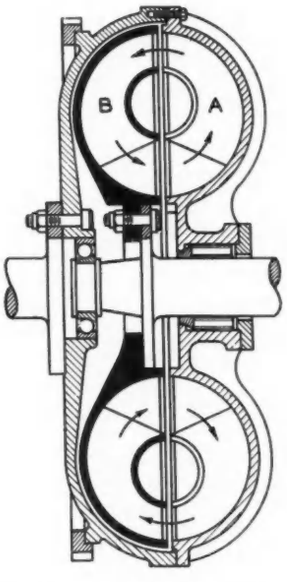


Fig. 1—Cross section of hydrokinetic coupling in which A is the impeller and B the runner

The liquid leaving the cells of the impeller, owing to its rotary motion around the axis of the rotors, impinges against the vanes of the runner, which have no rotary motion, thereby producing a driving force on these vanes. A driving force on the vanes of the runner is, of course, equivalent to a torque on the shaft on which the runner is mounted, that is, the driven shaft.

If the brake is now released, the low gear in the transmission engaged, and the friction clutch let in again, the torque load on the driven shaft is most likely to be less than the torque which the engine is capable of developing, and in that case the runner will be set in motion by the torque impressed upon it by the stream of liquid entering its cells. Between the cells of the impeller and those of the runner there is, of course, a certain free space, and this space is filled with liquid having a dual motion, an angular motion around the common axis of the two rotors, and superimposed upon this a motion in the direction substantially parallel to the axis of the rotors, from the impeller cells into the runner cells in that portion of the circuit most remote from the axis of rotation, and from the runner to the impeller cells in that portion closest to the axis.

When the driven shaft with its runner is rotating—in the same direction, of course, as the driving shaft with its impeller—the liquid in the cells of the runner also rotates and, therefore, is subject to centrif-

ugal force, the same as the liquid in the cells of the impeller. The direction of the centrifugal force in each case is radially outward, and the two forces, therefore, are in opposition to each other in the fluid circuit, tending to cause the liquid to flow therein in opposite directions. However, as long as power is being transmitted from the driving to the driven shaft, the runner rotates at a lower speed than the impeller, consequently the centrifugal force on the liquid in the cells of the runner is less than the centrifugal force on the liquid in the cells of the impeller, and the difference between these two forces causes the liquid to flow through the circuit, the same as explained for the condition with the runner at rest. Since there is a torque on the driven shaft due to the impact of the fluid on the vanes of the runner, and the runner is rotating, power is being transmitted from the driving to the driven shaft.

The question now arises as to the relation between the torques on the driving and driven shafts, and between the angular speeds of these same shafts. The resisting torque on the runner is, of course, determined by the load on the driven shaft. Provided this is less than the maximum torque which the engine can produce, as the accelerator pedal is depressed the engine torque will automatically adjust itself to the torque load, which latter varies with the speed of the vehicle. Under steady driving conditions at least, the torque on the driven shaft will always be the same as the torque on the driving shaft, in accordance with the principle that to every action of a mechanical nature there is an equal and opposite reaction. In a hydrokinetic coupling there are only two members on which the circulating liquid can act in the direction of rotation of the vanes, namely, the impeller and the runner, and the forward force exerted by the liquid on the vanes of the runner is equalled by a reaction of the liquid on the vanes of the impeller in the direction opposite that of rotation. The active and reactive forces are equal, and as the lever arms through which they act are equal, the torques on the impeller and runner are equal.

The torque which is transmitted from the impeller to the runner is equal to the change of momentum of the liquid in the impeller (or in the runner). At the outlet from the impeller the momentum of the liquid is equal to the product of the mass of liquid flowing per second (lb. per sec. divided by 32.2) by the mean radius of the outlet, in ft., by the tangential velocity of the liquid at the outlet in ft. per sec. Similarly, the momentum of the liquid at the inlet to the impeller is equal to the product of the mass of liquid entering per second (lb. per sec. divided by 32.2) by the mean radius of the impeller inlet, in ft., by the tangential velocity of the liquid at the inlet, in ft. per sec. The difference between these two products is the change in momentum of the liquid, and, therefore, the torque transmitted, in lb-ft. Thus if the radii of the inlet to and the outlet from the impeller, and the tangential velocities of the liquid at inlet and outlet are known, the rate of circulation of the liquid, in lb. per sec., corresponding to any given torque can be readily calculated.

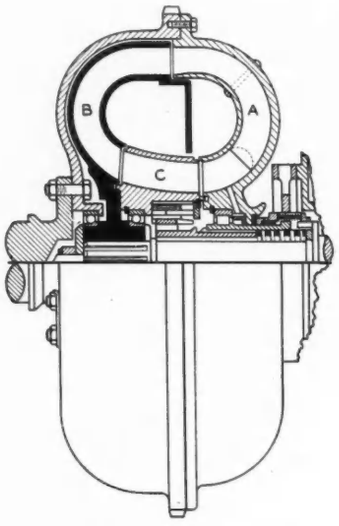


Fig. 2—A hydrokinetic torque converter in which A is the impeller, B the runner and C a reaction member

There is, of course, a certain amount of loss in the coupling when in operation, due to internal friction of the more or less viscous liquid and skin friction between the liquid and the metal surfaces. Consequently, less power is received by the runner than is conveyed from the engine to the impeller. As the torques on impeller and runner are the same, it follows that the speed of the runner must always be lower than that of the impeller (as long as power is transmitted through the device from the impeller to the runner). The difference between the speeds of rotation of the impeller and runner is referred to as the slip, and this slip, expressed as a percentage of the speed of the impeller, is a measure of the power loss in the coupling.

During periods of acceleration of the car there is a great deal of slip, and consequently considerable loss within the coupling. At the beginning, while the runner is at a standstill, there is a 100 per cent slip, and the efficiency of the coupling, therefore, starts from zero. On level roads the car will pick up speed quite rapidly, and the rotary speed of the runner will approach that of the impeller, with a constant increase in the efficiency of transmission. At constant speed the slip in the coupling usually amounts to only about 2 per cent, except at very low speeds. The power lost in the coupling is converted into heat which is radiated from its outer surface, the latter sometimes being finned to increase its radiating capacity.

The hydrokinetic coupling on an automobile takes the place of the engine flywheel and forms a flexible link in the chain of transmission members which prevents the transmission of shocks from the engine to the road wheels, and vice versa. It cannot well replace the friction clutch used in conjunction with a transmission in which the different speeds are engaged by sliding gears into mesh or by engaging positive clutches because of its inertia, and for this reason it has been much used in combination with planetary transmissions, which need no separate friction clutch.

While the hydrokinetic coupling will not multiply the engine torque for acceleration and hill climbing, a very similar device, properly described as a hydrokinetic torque converter, is capable of doing this. It was shown in the foregoing that the reason there can be no greater torque on the runner of the coupling than the engine torque or impeller torque, is that there is no other member besides the impeller to take the reaction to the torque on the runner, and as the impeller torque is limited by the engine torque, there can be no torque multiplication. To make it possible to multiply the torque it is necessary to provide a third member, called a reaction member. This member must carry vanes against which the streams of liquid can impinge, and it must be held from rotation so that the reaction of the vanes to the stream of liquid may change the tangential velocity of the latter around the common axis of the impeller and runner.

One possible arrangement of a hydrokinetic torque converter is

shown in Fig. 2. Here *A* is the impeller, *B* the runner, and *C* the reaction member. This device, the same as the hydrokinetic coupling, obeys two fundamental laws, namely, that when running at constant speed, the active torque and torque reaction must be equal and opposite, and the energy imparted to a given mass of the liquid by the impeller minus the internal loss attributable to that mass, must be abstracted from it by the runner. No energy is absorbed by the reaction member, as that member has no motion.

The liquid in the cells of the impeller and runner has a dual motion. It flows through the circuits in planes passing through the axis of the converter, and it rotates about this same axis with the impeller and runner. There is no material change in the velocity of flow in planes through the axis of rotation, as the cross sectional area of the circuit is substantially constant throughout, and equal amounts of liquid necessarily must pass all points in a given length of time. But the velocity of the liquid around the axis of rotation increases in direct proportion to its distance from the axis. The liquid enters the cells of the impeller near the axis of rotation, and as it passes to the outlet from these cells, which is further from the axis of rotation, its velocity, and, therefore, its kinetic energy, increases. The liquid retains substantially all of this kinetic energy as it enters the cells of the runner, the entrance to the runner being at the same mean distance from the axis as the outlet from the impeller. But in the cells of the runner the liquid flows toward the axis of rotation, whereby its velocity in planes perpendicular to the axis of rotation, and hence its kinetic energy, is decreased. The energy lost by the liquid in passing through the runner is conveyed to the latter and by it to the driven shaft.

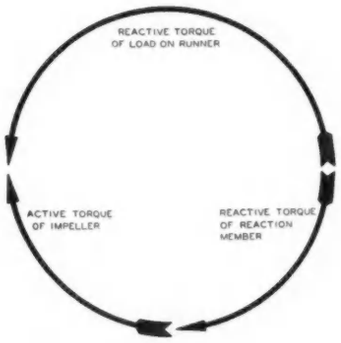


Fig. 3—Showing how the reaction member takes the reaction from the excess of torque on the runner above that on the impeller

As there is no loss of energy to the reaction member, the energy gained by the liquid in the cells of the impeller is given off by it in the cells of the runner, except for the few per cent of loss in internal friction. Therefore, if the runner turns at, say, one half the speed of the impeller, the torque on it will be nearly twice the impeller torque. The difference between these two torques will react on the reaction member, as indicated in Fig. 3. The liquid presses against the vanes of the reaction member in the same angular direction as it presses against the vanes of the impeller.

A New No-Draft Ventilation

A new no-draft ventilating system for automobiles, known as the Kleenair system, has been developed in Sweden and is the subject of a recent U. S. patent issued to John Hedin. The ventilator construction differs according to whether the windshield is fixed or adjustable. For fixed windshields — which predominate in the United States—the ventilator is given the form shown in the drawing herewith. In the patent specification it is explained that for efficient ventilation of a closed body, when the car is in motion the fresh air must be allowed to enter at considerable speed, so that a sufficient over-pressure will be produced inside to force out the contaminated air and keep gasoline vapors and exhaust gases out of the body. Another requirement is that the incoming current of fresh air be directed toward the roof, so that its velocity will be materially reduced before it reaches the passengers, to the end that the latter may not be inconvenienced by drafts.

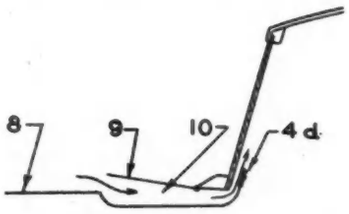
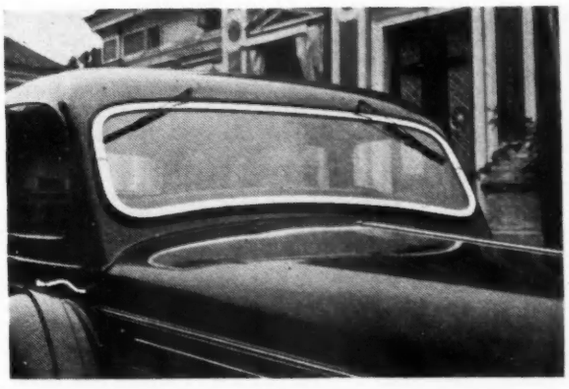


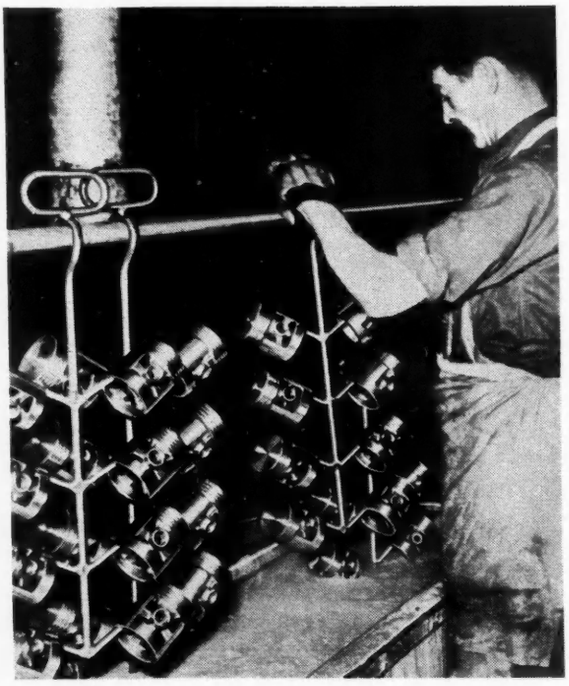
Diagram of Kleenair ventilator applied to car with fixed windshield

As shown in the drawing, a flap 9 is provided at the rear end of the engine hood 8, hinged at its rear edge. Below this flap there is an air chamber 10, and at the rear of this chamber inside the car there is a baffle 4d, which directs the incoming current of air upward toward the ceiling. When the forward edge of the flap 9 is raised, and the car is in motion, air enters the chamber 10 by reason of the over-pressure existing at its entrance.

The photograph reproduced herewith shows the ventilator applied to a Dodge car and serves to bring out the point made by the inventor that application of the ventilator does not make any material difference in the appearance of the car, as the ventilator flap is painted in body color and when open leaves only a narrow slot between it and the hood. On the inside, also, the baffle required does not detract from the appearance in any way.



Dodge car with Kleenair ventilator installed



Pistons of Dodge engines are tin-coated by a chemical process based on the fact that aluminum will displace the tin in an alkaline solution. Here the previously finished pistons are being immersed in a hot solution of sodium stannate

Production Lines

On Ventilation

Industrial Standardization, November, 1938, notes that the ASA Exhaust Code Committee is planning the formulation of a code for ventilation in electroplating operations. The code will cover only certain types of operations such as — chromium, cadmium, lead, and cynaide solutions. The plan calls for a classification of the principal operations into groups according to hazards; and a definition of type and degree of ventilation necessary for each group.

Aluminum Cylinder Heads in France

Among French passenger car models with engines equipped with aluminum cylinder heads are the Renault Juvaquatre, Primaquatre, Novaquatre, Vivasport and Viva Grand Sport; the Peugeot 202 and 402, the Matford, Chenard & Walcker, Delahaye Type 165, Unic Four and Six, Panhard and Talbot Six. Among French commercial vehicles having engines with aluminum cylinder heads are the Latil, Matford, Peugeot, Renault, Saurer, Somua and Unic. The principal object in using aluminum instead of cast iron cylinder heads is to make it possible to increase the compression ratio, thereby increasing the output and the efficiency of the engine. Since commercial vehicles, as a rule, cover a greater mileage annually than passenger cars, the gain in economy due to the use of higher compressions should be more important in their case.

Rare Metals

Without benefit of the usual fanfare, the scientists over at the P. R. Mallory laboratories have been developing useful alloys based on the unique properties of rare metals. To many of us, the names Uranium, Thorium, Zirconium, Rhenium, and the like are but symbols of the upward sweep of modern chemistry. To the men in Indianapolis, they represent the basis for valuable new engineering materials. Take as an example—Mallory 1000— a new metal, possessing the greatest density of any engineering material known to the art. It has high specific density, high physical properties. It lends itself to application on gyroscopes, small compact flywheels, counterweights for aircraft engine crankshafts where space is at a premium. What the real applications are, no one knows at the moment but a consideration of these special alloys and their properties surely would be of profit to metallurgists and engineers.

About Engines

Alex Taub in his brilliant presentation on the subject of engine design at the December meeting of Detroit Section, SAE, made a number of points that must not go unnoticed. Paraphrasing him, the engine is being tucked away more and more in relatively inaccessible parts of the vehicle. This can be made increasingly feasible if engines can be so designed as to operate for long periods without need for attention. Important step in this direction is the adoption of automatic valve lifters. In combination with good valves and seat inserts, at least the valve gearing, frequent source of tinkering adjustments, could be made foolproof. Taub also urged the need for better gasketing so as to seal the engine both at top and bottom, thus preventing oil leakage, promoting better oil economy. He said more but that would mean a complete digesting of his paper.

Many Questions

We have completed the first two of a series of SAE section meetings talks about the design features of '39 motor cars. An audience is most unpredictable in its reaction and it is amazing to note the breadth of the questions that can arise from a group of several hundred people having diverse interests. Most frequent questions—"What about the Diesel" —"When rear engine cars"—"How soon automatic transmissions"—"Why do we use ideas originating in Europe"—"Why the similarity in eye-appeal." And so on and on.—J. G.

Dealers Sitting Tight

(Continued from page 105)

on the books and operative. This is not to say, however, that Wisconsin laws would work just as well if transplanted to other states. The dealers in that state take a very broad view. The majority seem not to have expected a panacea for all ills, recognize that it will take time to work out to the best practical ends, and as a result are gratified when a more impatient group might be lapsing into despair.

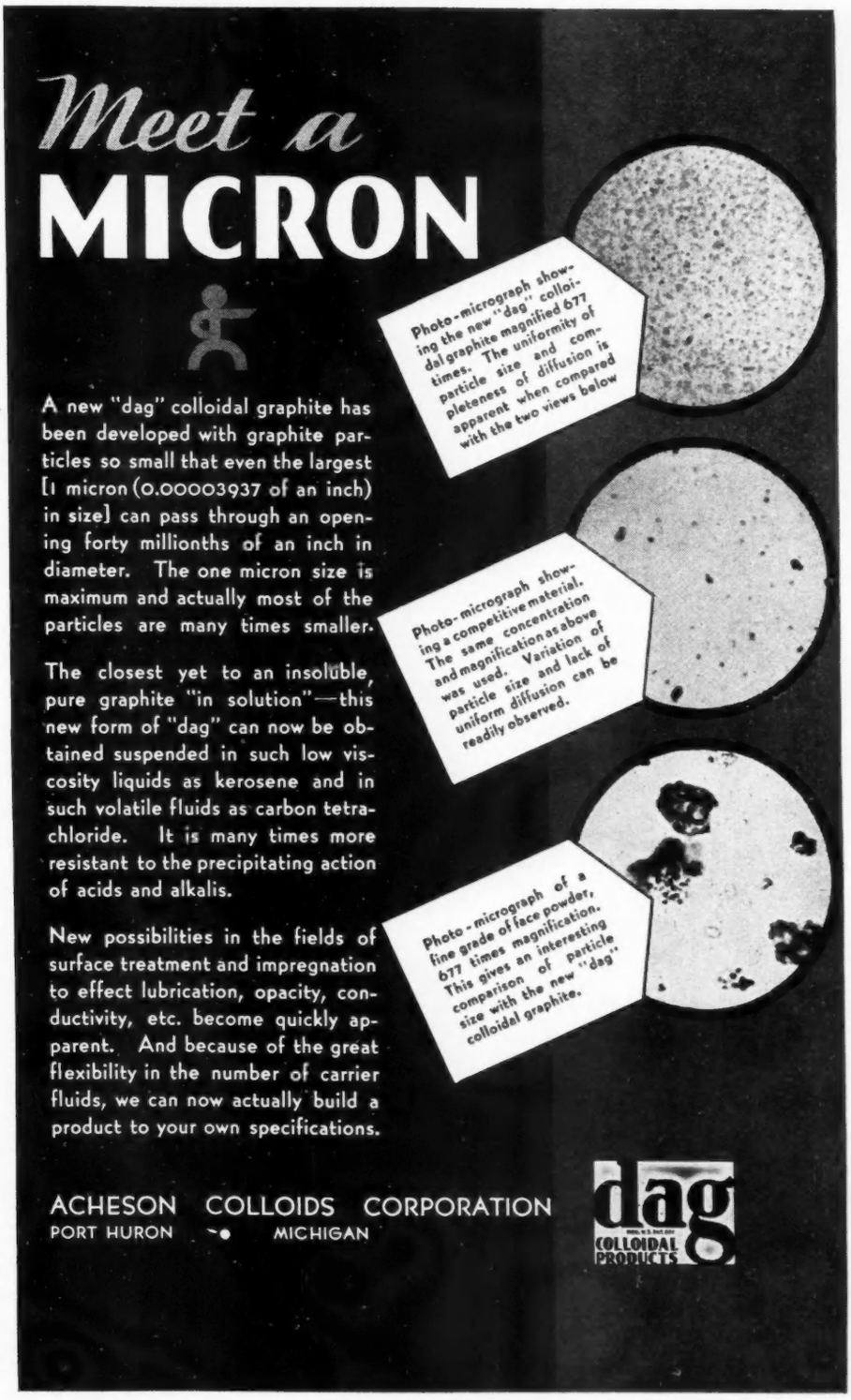
The dealers are split on the matter of used car price-fixing laws. The best operators, those who are selling transportation rather than differentiated new and used cars, are not in favor of legislated prices. They view price-fixing as merely penalizing the careful car owner in a different way. One sage dealer comments that used car legislation aims at altering effect, while licensing laws aim at cause, and there is an indication that others are of much the same view.

Of all the suggested reforms to be desired, the policy of "plowing under" has the most adherents. Dealers would like to see the junking plan revived because they are having a devil of a time moving jallopies and financial help to bury them or turn them into munitions is a fond dream. It is only a dream because despite the earnest wish there is little expectation of factory aid in this direction.

Dealers would also like to see a reduction in the number of their clan. They believe that fewer retail outlets coupled with closed territory and severe infringement penalties would improve the situation. If, as they hope, this would limit sales to those that could be made with profit, it would, in their estimation, merely be creating an output situation which the manufacturer will have to face sooner or later—and the sooner the better because there is a terrific amount of surplus transportation awaiting wearing out.

No matter what the dealer advocates in the way of aid, it touches the used car in some shape or manner. Some would like the manufacturer to concentrate selling help on the used car and forget about the new cars, since they practically sell themselves. If help is not given, and the used car problem remains critical, divorcing the sale of used and new cars is the only way out seen by many dealers. Just how this is to be brought about has not been thought through to any logical conclusion, but it is a bee that has begun to buzz.

Dealers take a good deal of pride in the vast development of automobile manufacture, particularly those who have been in retailing a long time (there are some) and that is one reason they take the low state of the retailing situation so much to heart. After years of sweating they have awakened to the fact that they have built nothing, created nothing that has a tangible value to leave behind, and it bites deep. Even the newcomers are touched by the situation. They even asked the interviewer, "What will I have ten years from now? If I don't succeed I lose;

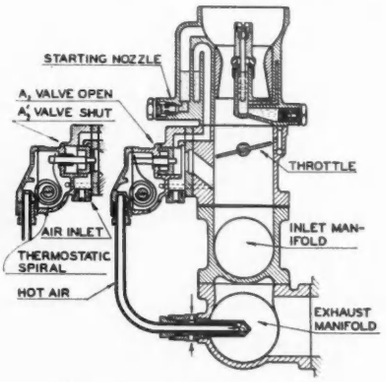


if I do build up a business it can be taken away from me at short notice. What have I got to work for?"

Not one, but many, dealers call attention to the fact that they have helped to build an industry, but have built nothing for themselves; that they have contributed much capital to the great expansion but they dislike the idea of continuing capital levies upon the dealer body. They even have sympathy of the "misery likes company" sort for the manufacturer, realizing that some serious and not fully explained maladjustment is giving the entire industry a headache. This leads them to believe that factory brains must be as bewildered as their own and that there will be no solution coming from factory quarters as long as there is "one sucker with capital left uncaught."

Solex Thermostarter

A substitute for the automatic choke as an aid in cold starting has been developed by the firm of Goudard & Menesson, manufacturers of the Solex carburetor. It is known as the Thermostarter and consists essentially of a bypass to the throttle in which there is a valve that is controlled by a thermostatic spiral. The bypass to the throttle passes through what is generally known as an accelerator well, which is normally kept filled with gasoline through a metering orifice. When the engine is being started from cold, the valve in the bypass is open, and air is drawn through the bypass and carries along fuel from the well,



Solex thermostarter diagrammatically shown

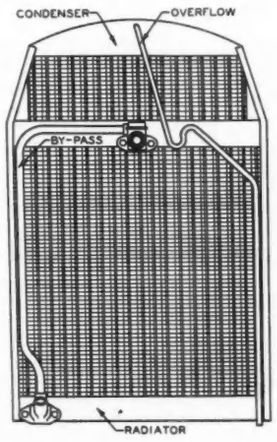
the mixture being delivered into the mixture tube of the carburetor below the throttle valve. The thermostatic spiral is enclosed in a housing on the outside of the carburetor, and hot air is furnished to this housing by a tube whose lower end extends into the exhaust manifold. After the engine is started the spiral warms up gradually, and in doing so uncoils and closes the valve in the bypass. The bypass is thus closed and the mixture leaned down gradually. This device is claimed to give instantaneous starts even in very cold weather, to be very reliable because of its simplicity, to save gasoline, and to be absolutely automatic.

A New Cooling System

A NEW cooling system for automotive vehicles and industrial power units has been developed by George W. Walker and Homer B. Morrow, of Platteville, Wis., and has been patented by them. Tests of the system were made on an Ingersoll-Rand compressor unit powered with a 65-h.p. Waukesha Hesselman engine, and are said to have given very satisfactory results.

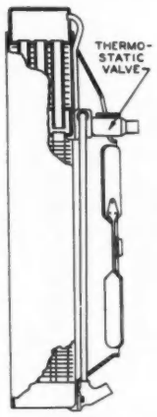
One of the objects of the system is to prevent loss of cooling liquid, by condensing any vapors that may form. As this obviates the frequent addition of new cooling fluid, it also

prevents clogging of the radiator core with lime, etc. A thermostatic valve is provided to enable the engine to quickly attain its normal operating temperature after starting from cold. The system also comprises an overflow pipe and a filler neck.



The system consists of two radiators one functioning as a condenser

As shown in the accompanying drawings, the system consists essentially of a conventional radiator with a second radiator functioning as a condenser on top of it, the top tank of the radiator forming the bottom tank of the condenser. The filler opening is on the intermediate tank and is so located that it is impossible to fill the system with liquid to the top of this tank. Located within the inlet fitting of the radiator is a thermostatically-controlled valve which is closed when the water leaving the engine is below a predetermined temperature, the water then returning to the pump by way of a by-pass tube. When the normal operating temperature is reached, the valve opens and the water is passed through the radiator.



Side view of the new cooling system

An overflow pipe is fitted into the top tank of the condenser and passes down the back of the radiator. Where it passes the intermediate tank, it is formed into an S curve, and at the lowest point of this curved portion the pipe communicates with the intermediate tank through a small orifice. When the fluid in the intermediate tank is at normal level, some of it will flow into the overflow pipe and form a seal, but if any pressure should be generated in the system due to excessive evaporation, the fluid in the overflow pipe would be blown out and the pressure relieved. After the pressure is relieved the seal is automatically restored.

IN Germany, fuel-consumption tests intended to furnish figures for use in car advertising must now be made under standardized procedure. The test must be run over any fairly level stretch of the Reichsautobahn between 30 and 36 miles long, in both directions, at a uniform speed approximately equal to two-thirds the maximum speed of the car. The rate of consumption shown by the test must be increased by 10 per cent to allow for the less favorable conditions in driving on ordinary roads.

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